THIRD ANNUAL

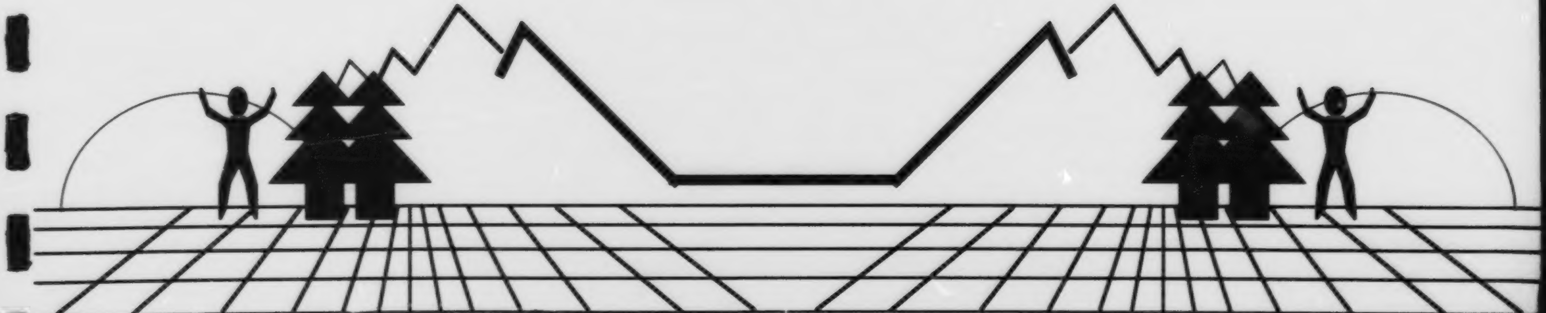
ELECTRIC ENERGY

FORUM

Lifestyles, the Environment and Electricity Use

PROCEEDINGS

May 6, 7, 8, 1990
Coast Inn of the North
Prince George, B.C.



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Third Annual
Electric Energy Forum

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Sponsored by

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THIRD ANNUAL

ELECTRIC ENERGY

FORUM

Lifestyles, the Environment and Electricity Use

SUMMARY

SUMMARY

The Third Annual Electric Energy Forum was held in Prince George from Sunday, 6 May to Tuesday, 8 May 1990. Delegates arrived during one of the worst spring windstorms in recent history, with widespread electrical outages experienced in Prince George and throughout the Northern Region.

Despite the stormy weather, the Forum, held at the Coast Inn of the North in Prince George, drew over 200 delegates from across B.C. Two electric vehicles were demonstrated. One, licensed for road use, was used to give delegates demonstration test-drives around the city.

The initial Forum event was a field trip to view the cogeneration facilities of the Northwood Pulp and Timber Limited. Some 80 delegates enjoyed a well-run tour of Northwood's plant.

On Sunday evening, Conference Chairman, Chris Boatman, introduced Hydro Chairman Larry Bell and Prince George Mayor John Backhouse to open the Forum. Keynote speaker, futurist and environmentalist Dr. Hazel Henderson, challenged the adequacy of judging alternatives using traditional economics. She stated that new indicators, based on human values, are required to measure "a new kind of development: sustainable development". She claimed that if all the social and environmental costs are factored into decisions, the environmentally-acceptable solution generally turns out to be the most economic solution as well.
Dr. Henderson's thought-provoking address drew a great many questions from the floor.

Larry Bell, in his introduction and welcome on Monday morning, noted that in the first year of the Power Smart program, B.C. Hydro had already achieved energy saving sufficient to supply the requirements of 5000 new homes at half the cost to Hydro of traditional generating projects.

The morning session on Monday also included an address by John Foster, President of the World Energy Council on "Patterns of World Energy Use", and by Professor Emeritus Irving Fox on "Present Lifestyles & Electricity Use in B.C.". The final speaker of the morning session was Ed John, former Chief of the Carrier Sekani Tribal Council, whose subject was "A Native Indian's Perspective on Energy Use and the Environment".

A panel discussion ended the morning session. Panelists were Dr. Henderson, John Foster, Irving Fox and Ed John; with Bill Matson, Vice-President, Pulp, Northwood Pulp and Timber Limited, acting as the moderator. The panelists responded to questions arising from their earlier presentations.

The Luncheon Address was given by Richard Dalon, Deputy Minister of Environment, and was entitled "B.C.'s Environmental Strategy for the 1990s".

The afternoon session dealt with "Future Electricity Use and Its Impact on the Environment". Tim McDaniels spoke on "Sustainable Development", and what this concept might translate into for future pulp and paper plant developments. This was followed by a review by John Elizalde, Chief, Residential Programs Branch, Bonneville Power Administration, of electric energy conservation savings achieved in the U.S. Pacific Northwest during the five years their programs have been running.

A different perspective was provided in a lively presentation by the students of Kelly Road Secondary School in Prince George, winners of B.C. Hydro's High School Science competition. Their entry was entitled, "Future B.C. Lifestyles", and dealt with their expectations of an increasing scarcity of electric energy in the future.

The final presentations of the afternoon session were provided by B.C. Hydro's Ken Peterson, Director of Planning, who discussed the 1990 load forecast and resource alternatives; and by Dr. Zig Hathorn, Manager of Environmental Resources, who discussed B.C. Hydro's programs for environmental protection.

After dinner the delegates were the audience for a simulated energy crisis in the fictitious town of "Prince James". Moderator Walter Hardwick and 13 panelists representing the residential, commercial, government, and industrial customers of "Prince James" had to propose measures to achieve a 25 percent reduction in their electric energy demand over a 12-month period.

The moderator and panel had one hour to agree on energy-saving measures which could be introduced to achieve the necessary reduction in demand. The Crisis Simulation was taped and has already been shown locally on Prince George TV Station CKPG. Further showings are planned on the Knowledge Network in future.

Tuesday morning was devoted to open discussion in a workshop setting. Each workshop comprised a number of roundtable discussion groups of eight to ten people. A common questionnaire prepared for the workshop provided a most effective tool for focusing the discussion. At the end of the workshop, group leaders and volunteer scribes summarized the views of the delegates at each table.

The Honourable Jack Davis addressed the delegates at the Tuesday Luncheon. His topic was "New Directions for Energy Policy".

The initial afternoon presentation by B.C. Hydro's Rob Kikkert described the Energy Audits that B.C. Hydro had been carrying out throughout the province, and what simple measures have been found which can be adopted to achieve surprising electric energy savings.

After an "on-line" report to the Forum delegates from the Workshop Sessions, which included a review and analysis of the discussion, a panel discussion was conducted by Moderator Gary Bannerman. Panelists Jamie Alley (Ministry of Environment), John Elizalde (BPA), Steve Head (President B.C. Wildlife Federation), Professor Walter Hardwick (UBC), and Laurie Gray (Energy and Environment Engineer, CanFor) attempted to summarize the theme of the Forum and to articulate the difficult trade-offs we will all face in future in achieving the goal of sustainable development.

Closing remarks by Larry Bell concluded the three-day Forum.

Next year's Forum is planned for Victoria, from 16-18 April 1991.

THIRD ANNUAL
ELECTRIC ENERGY
FORUM

Lifestyles, the Environment and Electricity Use

INTRODUCTION AND KEYNOTE ADDRESS

THIRD ANNUAL ELECTRIC ENERGY FORUM
SUNDAY, 6 MAY 1990
6:45 P.M.

Introduction by Conference Chairman Chris Boatman

Good evening Ladies and Gentlemen. My name is Chris Boatman and I am your Conference Chairman. Welcome to B.C. Hydro's Third Annual Electric Energy Forum. If any of you have not yet received your registration package, you will be able to register at the conclusion of the keynote speech tonight.

Our speakers have agreed to answer some questions. You will find white slips in your registration package for written questions. If you could write your questions on these slips, we will have people circulating who will collect them from you. I will then pass them to our speakers at the end of their presentations.

We'll have a chance to talk more about the program tomorrow morning; but for this evening, I would now like to turn the proceedings over to Larry Bell, our Chairman and CEO, who has a few introductions to make. He will then introduce our keynote speaker for this evening.

Official Opening and Introduction of Keynote Speaker

Larry Bell
Chairman and Chief Executive Officer
B.C. Hydro

Official Opening by Chairman of B.C. Hydro, Larry Bell

Thank you very much Chris, and before we start with the proceedings, I have an announcement. I am pleased to be able to introduce two new members to the Hydro Board of Directors. We are delighted that we will now have regional representation throughout British Columbia. Both of these new Board members are here tonight and I just would like to say a few words about them and then ask them to stand up.

First of all, I'd like to introduce John Whitmer, who, as many of you know, is active in the Council of Forest Industries, and has been very active in community work here in Prince George with a number of non-profit organizations. He is presently President and Director of Balfour Forest Products. John, welcome to B.C. Hydro.

From Terrace, I'd like to introduce David Lane. David is well known to those of you who have been involved with property tax in any way. For many years, he has been known as one of the experts in terms of appraisals, and has been called as an expert witness many times. We are just delighted that John, who is President of Dagney Development Corporation, and Lane Appraisals Ltd., is joining our Board. Welcome, David.

Welcome to you all this evening. We are delighted to see so many registrants. We were determined, Mr. Mayor, to make sure that you realize that we at Hydro don't just think that British Columbia starts and stops in downtown Vancouver. So we decided to change the venue of the Forum. We were just delighted with the kind of response that we've had from the City of Prince George.

It is fortuitous that we chose this year, because it is the 75th anniversary of Prince George. Inasmuch as this is my old home town, when I was approached to see whether B.C. Hydro would be prepared to put a written message advertising this anniversary on our bills, I had no problem in agreeing.

The Mayor tells me that Prince George is now the second largest city in the Province and the third largest metropolitan area. When I left here in the fifties, it clearly wasn't that. Prince George has shown remarkable growth over the last three decades and I'm sure you have good reason to be proud of your city.

I also want to recognize that the Mayor and his Council recently passed an energy conservation resolution here in Prince George. We've asked municipalities throughout the Province of British Columbia to establish and to agree to a set of conservation policies. Prince George is one of the first to adopt these policies as a specific directive to its municipal staff.

I'm delighted then to call upon Mayor John Backhouse to bring greetings to you on behalf of the City of Prince George.

Greetings on behalf of the City of Prince George

John Backhouse
Mayor of Prince George

Greetings on behalf of the City of Prince George by Mayor John Backhouse

Mr. Bell, ladies and gentlemen; on behalf of the City of Prince George, it is my privilege and pleasure to welcome you here this evening to this Energy Forum. I am delighted that B.C.'s northern capital has been selected as the location for the Third Electric Energy Forum, the first to be held outside the Lower Mainland. I may be a tad biased, but I think there is no better location for an Energy Forum to be held than the City of Prince George.

The theme of the Forum is "Lifestyles, the Environment, and Electricity Use", and that is of interest to people throughout this Province of ours, but it is particularly important in this region. We cherish our lifestyle, we wish to protect and preserve our environment, and we want to make the very best use of the electric energy available in order to support that lifestyle and to strengthen our role in the international economy. This is a balancing act indeed. Larry, I think at the last Energy Forum you mentioned this balancing problem that we are facing; the balance between the economy and the protection of the environment. To this end, energy conservation is obviously of prime importance. The City of Prince George, along with many other municipalities, has begun to examine its energy use. My thanks to B.C. Hydro for its assistance in ensuring that we could get that program underway. Individually, corporately and collectively, we must all strive for the more efficient use of our electricity resource.

During the next two days I hope the program of this Forum will challenge, stimulate and excite you.

I believe our Province has a bright and prosperous future and the key to that future is the efficient and effective use of electric energy.

I would like to thank the sponsors of this Forum, the two Ministries and B.C. Hydro for choosing Prince George as the location for the Third Annual Electric Energy Forum.

I hope the next two days are productive and enjoyable for all of you. Thank you very, very much ladies and gentlemen.

Recognition of Co-Sponsors

Larry Bell
Chairman and Chief Executive Officer
B.C. Hydro

Recognition of Co-Sponsors by Larry Bell

I would like to, at this point in time, recognize our two co-sponsors.

First, from the Ministry of the Environment, ladies and gentlemen, we have Richard Dalon, the Deputy Minister of the Ministry of the Environment. Richard, would you stand up?

Second, from the Ministry of Energy, Mines and Petroleum Resources, we have Phil Carter, Director of Electrical Policy, who is here representing Doug Horswill, Deputy Minister who is unfortunately ill. Phil, would you stand up and be recognized?

Introduction of Keynote Speaker, Dr. Hazel Henderson

Larry Bell
Chairman and Chief Executive Officer
B.C. Hydro

Introduction of Keynote Speaker, Dr. Hazel Henderson by Larry Bell

It is my pleasure to welcome, as a keynote speaker to the Forum, a futurist, environmentalist, and world citizen. That last title is not offered lightly. There are very few people I would term "World Citizens". Some of us are very proud that a Canadian also fits that category: Maurice Strong, who addressed our Second Forum in Vancouver last year.

I am delighted to welcome Hazel Henderson tonight. Dr. Henderson has challenged the adequacy of traditional economic methods in determining the environmental and social cost of development. In recent months, Dr. Henderson's travels have taken her to major conferences in the Soviet Union, China and Japan. Not surprisingly, her credentials are most impressive and it would require a very significant inroad into our time this evening to present them. However, let me recount for you one or two highlights.

She is author of "Creating Alternative Futures", and she also produced, wrote and hosted a twelve-part PBS television series of the same name. She is author of the "Politics of the Solar Age: Alternatives to Economics", numerous articles, monograms, editorials, and contributions to anthologies. She is an activist and founder of many public interest organizations and she has been a member of the Advisory Council to the U.S. Congress Office of Technology Assessment, and on advisory committees to the National Science Foundation, and the National Academy of Engineering. She also participates in editorial boards of several journals including "Technological Forecasting & Social Change", "Futures Research Quarterly" and the "Journal of Interdisciplinary Economics". She is the recipient of many awards, including an honourary doctorate from Worcester Polytechnic Institute for her work on alternate economics and technology. Ladies and gentlemen, it gives me great pleasure to present to you our keynote speaker, Dr. Hazel Henderson.

Keynote Address: Creating Conserver Societies on a Small Planet

Dr. Hazel Henderson
Futurist

Good evening. Well, it's really a delight to be back here in B.C. I am able to come to your beautiful Province every once in awhile, and it is also a very great honour to have the opportunity to address this very important Forum.

As the Mayor of Prince George stated so well, the environment is our livelihood and B.C. Hydro's Environmental Principles, its Power Smart and Resource Smart energy conservation programs will go a long way toward bringing a much needed balance between electricity use and the environment. B.C. Hydro's 1990 Electricity Plan, focusing on demand projections, flexibility and public input, augurs well for the future. Most of our forward-looking electric utilities in the U.S.A. are, as you know, moving in similar directions, including such measures as: increasing cogeneration; purchasing power from independent power producers; developing solar, wind and other alternatives; encouraging new construction machinery, home appliance standards; and adopting building codes designed for efficiency. So I want to focus tonight on creating conserver-societies on a small planet.

The themes of this Forum, lifestyles and the environment as they relate to electricity use, are symptomatic of fundamental changes that are occurring all over the world today. The debate raging in British Columbia over energy, conservation, environment and social costs of traditional industrial development, is only part of a world-wide re-assessment of traditional industrial development and a re-assessment of the whole Industrial Revolution. Everywhere I travel, whether its to Eastern Europe or the U.S.S.R. or Western Europe, or Latin America, we find that the issues of the 21st century are now emerging.

The Cold War confrontation since World War II really led to the economic decline of both of the former super powers as they both began to realize around 1988, in fact it may have been Japan that had won the Cold War. (See Exhibit 2-1.)

The new decade of the 1990s will definitely be an Era of Global Interdependence, and of what I call, "Mutually-Assured Development". The world debate has shifted now from East-West to North-South issues, and to a fundamental re-examination of what the term "development" actually means. What's emerging is the wholesale questioning of whether "economic development" is perhaps an oxymoron, and whether the whole debate must be reframed beyond economics, whether of left or right, as well as beyond what many now describe as the ideology of "economism" which underlies the ideology of industrialism and which have both led to today's widespread confusion over the difference between money and true wealth.

Money, of course, as even economists will admit, has no intrinsic value. Money is not a commodity, but merely a measuring rod and a medium of exchange, as long as people trust those who issue it. Money is supposed to represent the value of the real resources. It's supposed to track and keep score of innovation, production, consumption, exchange, recycling and depletion. The only real resources, as you know, are creative human beings, the productivity of nature, and the resources of the earth.

Economists are often confused about all of this and they tend to track only money-denominated wealth. (See Exhibit 2-2.) They see a shallow pie of narrowly conceived scarcity which overlooks the underlying majority of options and alternatives open to humans in satisfying their needs and desires. This cake model that I use expands the pie and its per-capita averaged, money-denominated Gross National Product view of reality. Economists view only the top two layers of my cake, and all of that which is denominated in money or tracked in shadow prices. The two lower layers are generally overlooked in most economic analysis. The third layer down is what I refer to the "love economy" and that is the informal, unpaid economic sectors which comprise 50 percent (in many countries much more than that), of all productive activities, and the lower layer of the cake, the productivity of Mother Nature on which the whole thing rests.

What we have really been finding in most industrial societies is that as you ignore those two lower layers of the cake, the GNP-denominated economy tends to cannibalize those two lower layers, until finally they break down, and then there is tremendous cost in restoring the depletion that has occurred. I remember, back in the mid-1970s, testifying before the Joint Economic Committee of the Congress, where the big issue was about the decline in the U.S. productivity. My point then was simply that we had been overstating productivity for decades and sweeping all of the social and environmental costs under the rug, and of course they were re-appearing and the bills were coming due. Today, as we expand our horizons, we have to allow for all of these broader factors.

What's interesting to me is to compare the different assumptions and forecasting styles between economists and futurists. (See Exhibit 2-3.)

Today, as we expand our horizons, we must bring into consideration all these factors and disciplines, and send economists back to school to learn ecology, biology and a more systematic world view. Many new ways of accounting for our "development" and correcting the GNP are emerging. (See Exhibit 2-4.)

So I've gone through a whole list of these contrasting assumptions which I think underlie a lot of the problems that we are having today in bringing the economic and the environmental view of the world into some kind of alignment. But as we go beyond these kind of traditional macro-economic policy models, it's not as if we have to fly blind. In fact, I know that you probably agree with me at this point, that trying to manage complex industrial societies using the gross national product as the overall measure of whether they are making progress is a little like trying to fly a Boeing 747 with no instruments on the instrument panel except perhaps an oil pressure gauge. You don't have anything to tell you whether the flaps are up or down, or whether the gas tank is full, or what your altitude is, and so in a sense, what I was doing all through the 1970s was trying to develop some of these post-economic policy tools. You are quite familiar with many of them, I'm sure. The one that I was most involved in developing was that of technology assessment, but today, I suppose, chaos theory is probably becoming the most fashionable new tool for policy makers. What I have been finding is that a lot of my economist friends now are beginning to look around and see if they can find a chaos theorist to take to lunch.

The whole idea of progress and development do seem very deeply rooted in the human psyche and are, therefore, easily used by politicians, business executives, advertising agencies, labour leaders, consumer advocates, and even environmentalists, to manipulate public opinion in every country. Progress has been equated for the past 250 years with industrialism's promise of material abundance eventually trickling down to everyone on the planet. I think both Karl Marx and Adam Smith would have agreed, as have their followers, on the underlying goal of industrialism. All they differed about really was how it was going to be achieved. So these twin ideologies of industrialism and economism sort of marched in lock-step, together with their concepts of exploitation of resources and expansion, efficiency, technological determinism, and its inevitable centralization of power and wealth in the hands of governments, and global corporations which have culminated in the Cold War and now the new page of history that's opening before us today.

So today these ideologies of industrialism and economism have unleashed seven great forces that are now globalizing our societies and transforming our geopolitics. (See Exhibit 2-5.) I'm sure that you could add to this; but for me, there are these six great forces, plus the effects of global feedback. First of all, the globalization of technology. Secondly, the globalization of our financial system, where we now have about $500 billion of hot currency sloshing around the planet every 24 hours. The third, the globalization of employment and work, which has changed the ball game for almost everybody who is trying to manage a local economy. The globalization of human effects on the biosphere. I think the satellite photographs that NASA is bringing back really give that incontrovertible evidence of our effects. The fifth is the globalization of militarization, in other words, the scale of human weapons now, whether it is nuclear weapons or chemical weapons is so globe-girdling that really we have got to a stage in history where war itself is becoming obsolete. And sixth, I think the globalization of consumption, where all over the Third World people are watching Dallas on their television screens (which appalls me), and my little friends in China love Mickey Mouse. But the good news though, is that all over the world there is arising this new kind of human being that we might call a "global citizen". Of course, the seventh globalization is really all of the interactions, inter-relations and the feedback loops. (See Exhibit 2-6.) That is what is really driving all the restructuring in countries all across the globe today.

I was in the Soviet Union in January and had the temerity in the speech I was making to state that President Gorbachev had not initiated Perestroika, it's really these forces of industrialism. All I think that he did was to try to get ahead of the power curve and realize that his society was going to have to ride that tiger just like every other society is going to have to. There is no way that he could keep out of the Soviet Union such things as satellite relayed broadcasts, personal computers, radio and television.

So, in a sense, we are now in a situation where all nation states are losing their sovereignty, and if you think of it, politicians can no longer deliver on the promises that they make to voters. This is why, in some sense, I think politics is in such low repute. For example, there is no leader anywhere who can really deliver on the promise to protect their citizens in time of war. They can no longer protect their citizens from pollution drifting across boundaries. They can't protect their citizens and can't deliver on full employment, which most of them promise, and of course, worst of all, they can no longer promise or deliver on the macro-economic managing of their domestic economy.

All of the politician's brave talk about fine-tuning the economy - the problem there is that the variables that you need to control in order to be able to manage a domestic economy have migrated out into that fast lane and you can't do monetarism because of these enormous currency flows. Nobody knows yet how to even measure a global kind of a monetary aggregate. What is also happening is that this is what is really driving the paradigm shift in terms of research methods and policy tools.

The old static sort of view of exactitude and the need to collect all the facts is giving way now to much more fuzzy and much broader policy tools. The shift is from that micro-rigour, where you were trying to control all the boundaries of your study, to what you might call macro-rigour, where the study is most sensitive to where you drew the boundaries in the first place.

So it is really a completely different ball game and what's very interesting to me is how far our academic curriculum has fallen behind. I have been finding in the last few years, that more and more I'm going and talking at universities where all they want to talk about is restructuring the university curriculum.

What's really happening, as one goes around the world checking in on these debates, you find that most of them, whether it's in Britain where they are talking about whether they should privatize, or whether they should nationalize; or the kind of debate that has been going on in the U.S.: did we do right to deregulate the airlines, or should we re-regulate the airlines? I mean the whole question now just comes down to these very two fundamental questions. (See Exhibit 2-7.) First of all, what is valuable under very rapidly changing conditions? There are a lot of economic models that still consider air and water to be free goods and, even more troublesome to economic theory, is how to value information. As you know, economic theory dealing mostly in the idea of scarcity can't deal with a commodity like information which is inherently abundant. So there are a lot of problems there. The second question is simply what, when, why, where and how to regulate or deregulate?

We need to get beyond this Cold War rhetoric, which I still hear a lot of, where people, journalists particularly from the West, who visit the Soviet Union say, "Well, capitalism won". But I find that if you get down to the fundamentals, what we are really talking about is just those two questions. In a sense, if you are talking about rules, and the fact that all economies are fundamentally just sets of rules derived from different cultural norms, you might as well use game theory. It's quite clarifying, as a matter of fact. Of course, if you use zero-sum game theory, you get a very different view of the kind of debates that are going on right now in economic theory about how to value common-property resources. So I won't go any further into that as I have written a paper on this subject for those who are interested.

I think that what's happening today is that we have a lot of agonizing re-assessments of all of these issues of values and policies. The whole problem was that the old style of economic development really bogged down in the 1980s in indebtedness, hunger, and ecological destruction in Third World countries. The whole concept really has gone into reverse. These agonizing re-assessments are also evident at the World Bank. Their over-investments in energy-sector projects in many Third World countries was really what led to a lot of this mountain of unmanageable debt. It was the same kind of problem, the underestimation of costs, human welfare impacts, and environmental destruction and the overestimation of benefits. In addition, of course, is the confusion between money and real wealth. I know that there are similar debates going on like this in Canada. We see the same kind of re-assessments going on in the U.S., particularly right now over the taxpayers bailout of the excesses of the deregulated savings and loan industry. To our horror, suddenly we are finding that the taxpayers are going to have to pay what looks like about twice the inflation-adjusted cost of another Marshall Plan. It's just an extraordinary scandal. You can also see the kind of painful re-assessments going on in the Soviet Union and Eastern Europe over the failures of central planning, and socialism's attempts to micro-manage every aspect of economic activity. We know that just doesn't work either.

I think that everybody is now sort of looking for the next policy direction, and my belief is that it can't come without a lot of feedback from the people of the grass-roots who have been on the receiving end of all of these central decisions.

What I noticed, as I read through the Proceedings of the last Electric Energy Forum that you had a year ago was the comments voiced at the workshop sessions. The feedback clearly stressed the need for greater public involvement and earlier participation in planning processes for decisions being made both by the Provincial Government and by B.C. Hydro. There was also concern for the way that policy decisions are made, and the conflicting roles of Hydro as an energy-developer, a conserver, and an environmental planner. Now obviously, B.C. Hydro is well aware of all of this, and that's why we are all here today. B.C. Hydro is responding to all of this feedback, and it seems really that all of this sort of Monday morning quarterbacking is vital because we need to truly learn, all over this planet, what were the mistakes of the industrial era, and what lessons we learned now that era appears to be receding.

I remember reading other feedback, reported from the Forum workshops last year, pinpointing the shortcomings of economic theory in practice, and the propensity to ignore or downplay longer-term and less-quantifiable social and environmental risks and benefits, as well as the values of equal or greater importance which were not quantifiable. Also I noticed that the feedback highlighted perceptions of a lack of attention to all the alternatives available, whether they be innovative social policies, better investment strategies, more efficient design, or consideration of renewable energy, solar and other technologies, all of which I think can together provide an alternative path to a more sustainable, equitable and high-quality future for B.C. I'm not telling you anything you don't know by reminding you that feedback is vital in managing complex systems. That's all we are talking about.

As all of these global debates emerge, I think it's worth comparing the one we are just beginning to have in the U.S.A., after we had the 1980s and what I call the "politics of denial". If you remember in the late 1970s, President Carter had issued the "Global 2000 Report". I was involved in that study, and it clearly showed that Americans could not go on growing the way they had, with only six percent of the world's population and using over 35 percent of the world's non-renewable resources. But, you know what happened in the 1980s, we slew the messenger and instead we brought in Mr. Reagan, who promised more good times on the global credit card and left us as the world's largest debtor nation.

So, for me it was very interesting to begin examining the relative decline of the U.S.A. in the world. (See Exhibit 2-8.) It has been a tremendous shock to Americans, and over the last three years there have been about 300 books written on the subject of the relative decline of the United States. A lot of them have used a rather sort of shallow economic analysis, which to me has been rather tautological because they would say that the problem is really the deficit, or the problem is our low savings rate, or that our interest rates are too high.

But of course, all of these are symptoms, they are not fundamental, and so I like to look at the overlooked fundamentals. The most important fundamental, I think was our lag in human capital resources investments, in other words, we let education go to pot, and we stopped investing in retraining and early childhood development. Secondly, our energy sector is still enormously inefficient and it still takes Americans about two and one half times as much energy to produce an equivalent unit of GNP as it does the Japanese.

Another fundamental was our health sector. Our health sector in the U.S. now absorbs 12 percent of our GNP and we don't seem to have any healthier citizens than countries that spend one-third of what we do.

Another fundamental is our approach to waste, i.e. throwing it away. We still only recycle ten percent of our waste stream in the U.S. and so, of course, we can't compete with the Japanese who now recycle over 50 percent of their waste. Similarly, we have much too high rates of resource depletion and a very inefficient tax code which actually subsidizes resource depletion. For example, oil depletion allowances, instead of what we need to do and that is to introduce oil depletion taxes. Similarly, we have a decaying infrastructure and a very consumer-oriented culture with a short-term focus. Some of these problems are now being given some attention. Hopefully, we will get a handle on them.

What's very interesting to me is that in Canada, for example, you have a health sector that only uses about seven percent of your GNP; but, in many areas of Canada I find that there is a lot of commonality with the United States.

I know that in Canada your energy-intensity per capita is about equivalent to ours. So we all need, all over the North American continent, to shape up on our energy sector if we are going to stay competitive. Conservation is at last being recognized for what it is, about seven times more cost-effective than adding new supply. Of course, B.C. Hydro's Power Smart and Resource Smart programs can free up about one and one-half times as much energy annually as could be generated, for example, by Site C.

My friend Amory Lovins told me, that he is estimating that the average cost of saving three-quarters of U.S. electricity consumption would be about 0.6¢/kW·h, several fold cheaper than just running a coal-fired plant. The American Council on Energy-Efficient Economy estimates that it would cost more like 1-2¢/kW·h. If either of these estimates proves correct the justification for building new powerplants or transmission lines would largely vanish; so, I guess B.C. Hydro should simply accelerate its drive for conservation and end-use efficiency. This kind of change, as we know, is going to be par for the course in the 1990s and a lot of companies won't be able to divest themselves of old product lines and invest in new markets fast enough to survive.

Iowa Public Service has decided to test Amory Lovins' estimates in the town of Rock Valley, Iowa. Its 2700 people will have their homes, apartment buildings, factories, and public buildings equipped with the very latest electricity-saving devices. A similar test is now being started by Pacific Gas and Electric.

As you know, the energy-savings in recycling are also enormous. For example, recycling aluminum cans only requires ten percent of the energy than to make new ones. As your Chairman, Larry Bell noted, B.C. Hydro itself was the place to start. I know you are recycling paper and installing high-efficiency lighting.

I am sure that this is going to be expanded, or maybe already has, so that all departments will purchase recycled paper, and contract with local paper companies to supply it, while hopefully urging the B.C. Government to institute recycling as a key to energy and material saving, and a more competitive economy. So there may be just a huge payoff also in throwing B.C. Hydro's weight behind maximum recycling efforts in the Vancouver area, and throughout the whole Province of B.C.

I think what I am saying, summing up, is that when all of the social and environmental costs are really factored in, we find that the environmental solution is also the economic solution. More and more countries, particularly in the Third World, are beginning to see that efficient energy and resource use is really the key to not only building healthy economies of the 1990s, but competitive ones.

What's interesting to me is that in 1973, Canada did produce a study that came out of the Science Council by Dr. Ursula Franklin called the "Conserver Society". (See Exhibit 2-9.) Well, I think that study should definitely be resuscitated because it raised all of these lifestyle issues and these value change issues over a decade ago. We are going to have to look at again if we are going to move forward on all of these issues.

In a sense, a sort of reaction set in in the 1980s. After the oil crisis, which really drove that conserver-society study, we all kind of went back to sleep and everybody decided to rely on the market and deregulate everything. I think what's happening now is that all of the new issues are really being driven by the failures of economic development based on that old model. (See Exhibit 2-10.) Many politicians, right up to today, still think that as long as you can keep those four barometers of distress: unemployment, inflation, deficit and interest rates, at kind of politically acceptably low levels, you can get re-elected. The whole problem is that that model now is really failing and the reason is, of course, that you try to push down one of those barometers of distress and the other three get worse. That became obvious all through the 1980s, and, of course, the reason was because the system really is much more complex than that.

The system really looks much more like this chart. (See Exhibit 2-11.) I remember, as I drew that chart, realizing that it's simply a dynamic non-linear feedback model of a living system. We have to remember that economies are living systems based on human beings interacting with their ecosystems. It's only economists that are freaked out by models like that. Many people in the life sciences, and particularly chaos theorists, are not at all surprised with a model like that.

What I have been developing for many countries is a new score card which we can use to measure a new kind of development, a sustainable development or whatever you want to call it. (See Exhibit 2-12.) My attempt to correct the GNP score card started about a year ago in a book I helped to produce for Venezuela, by first of all looking at the whole problem of per capita averaged income because we have all begun to realized that currencies are now fluctuating so rapidly that the money-denominated per capita income measures are really off-base. For example, in money-denominated terms, the Japanese appear to have a much higher income level than Americans do; but if you actually correct for this and compare the real standard of living between the people in those two countries, you know that there is something awry with money-denominated comparisons. So a lot of countries now are moving to purchasing power parity measures where you go back to time-coefficients and you ask some pretty basic questions like, how many hours does it take the Japanese to earn a bowl of rice, vis-a-vis, how many hours does a Russian have to work to buy a loaf of bread.

Then, secondly, the need is not only to look at per capita income but to look at income distribution. Is the poverty gap widening or narrowing? This is a very important measure of the success of a government's policies, and most people now are looking at the Latin American countries and realizing that one of their real serious problems is their income distribution because the gap between rich and poor is so wide. Another correction is to add into the GNP the productive hours worked that are unpaid. This is now being referred to as the "informal economy" and a lot of OECD studies have been done on this showing that, even in industrial countries, it amounts to about 50 percent of all of the production that goes on. So you can imagine that if you don't include that, it's like trying to operate the society with a map of only half the territory. Now this is particularly important in Latin America because as their currencies spin out of control and get into the kind of situations that you are getting now in Argentina and places like Brazil, where you have several hundred thousand percent inflation annually. Suddenly, the unpaid production is really the only thing that is going on. If they don't have some kind of handle on their "informal economy", then they don't know anything. Now, the GDP of the State of Alaska increased enormously last year because of the Valdez spill. So you must deduct the social and environmental costs before you can come up with a net figure. You see the kind of crazy accounting system that we have today. Also, for the accounting of depletion of non-renewable resources, it's very important to add an "energy input/GDP ratio". Most countries, of course, use energy/GDP ratios, but they haven't folded it into their official national score card, which is what is needed.

We also, in the Venezuelan case, added a military vs. civilian budget ratio because today we are really going to need to measure the performance of our Governments as to whether they are sort of "kneejerk" militarists or whether they are good negotiators, particularly considering the wind-down of the Cold War and the peace dividend that is going to become available.

At the same time we developed a whole lot of complementary indicators which are not quantified in money terms at all. (See Exhibit 2-13.) These are equally important and, of course, they include indicators such as: education - using literacy levels; health - mostly measured using indicators like infant mortality and life expectancy; and then all of these other indicators which are still being worked on such as nutrition; basic services; shelter; child development; political participation; democratic processes; status of minorities; air and water quality; pollution levels; environmental resource depletion; bio-diversity in species loss; and culture and recreational resources.

So it's really extraordinary to me to see Third World countries leading the parade in changing economic "score cards". Now one of the reasons they are, of course, is because they see this as a better way of dealing with the International Monetary Fund (IMF). If you are a heavily indebted country, and there are some that are even more indebted than Canada and the U.S.A., and the IMF is telling you that you've got to get your GNP growth rate up so that you can qualify for more loans. They are going to be able to say with this new score card, "Well now, we'd really like to help you out, but we just don't think that the score card you've submitted is very scientific, and we're using a better one. If we did, we all would lose so many more hectares of rain forest and it might contribute to the malnutrition or death of so many more children." You know how that sort of scenario would play in the court of public opinion.

So President Perez of Venezuela took this report of ours to the meeting of the non-aligned countries that took place in Belgrade last September. There are now 15 countries calling themselves the G15 who have set themselves up as an alternative economic summit and they are having their first meeting in Kuala Lumpur in June 1990. What's interesting is that they represent 30 percent of the world's population, whereas the G7, which is meeting in Houston in July, only represents 12.9 percent of the world's population. We are talking about big countries in the G15 like India, Venezuela, Mexico, Brazil, Indonesia, and Malaysia. What I am saying is the debate about the values to be used in judging development has now been joined on a global basis, North-South.

Of course, how this affects us in North America is that we are not going to be able to get away with demanding that countries in the Southern Hemisphere like India and China forego additional development just because we added most of the CO_2 and the ozone-depleting gases to the world's atmosphere. Unless we do something about our own lifestyles, what will happen is the world policy deadlock on all of these issues is going to continue until the Southern Hemisphere countries see our efforts to reshape our own societies and our own lifestyles, really bearing fruit. Once they begin to see that fruit, they may be willing to come to the bargaining table on all the issues that we are concerned with.

What is really happening with all of these restructurings? I think that the values in industrial societies, the values that got us to this point, are beginning to peak. A lot of them really were short-term values based on individualism and greed particularly in the United States. (See Exhibit 2-14.) They have peaked now - all that speculation, and the paper asset shuffling, and the leverage buy-outs and the borrowing, and the debt financing that led to the budget and trade deficits, and all of those consumption values, which finally turned into addictions.

I don't know whether you have seen those incredible bumper stickers in the U.S. which say, "Born to Shop". Isn't that awful? You know the "Lifestyles of the Rich and Famous". What I am seeing happening in all the industrial societies now is the emerging of the long-term view, the inter-generational view, the sustainable development view, and the concern for such areas as socially responsible investing.

I have been involved in this investing movement since 1982 as a member of the Calvert Social Investment Fund which is one of those mutual funds that doesn't invest in companies that pollute the environment excessively or manufacture weapons, or do business in South Africa, or are involved in nuclear energy, or unfair to workers. I remember when we started that fund in 1982, all of our cynical Wall Street friends said, "Well, are there any companies left to invest in, if you have to avoid all of these companies in your portfolio?" What we've shown in the last decade is that you can build a very successful portfolio by picking the kind of companies that are going to emerge in the sustainable economy. It's really the ultimate contrarian strategy. We have almost no companies in the Fortune 500 list, but we have lots and lots of over-the-counter stocks which we bought into very cheaply. For example, we bought Wellman of New

Jersey, which is involved in recycling plastics. Most of our companies are positioned in the renewable sector and are based on minimal throughput and the least entropic kind of processes, as well as education, health care services, and all the other areas that we feel are going to emerge later. This long-term value system that's emerging now is very interesting.

By the way, I don't know whether any of you have seen this little book called "Shopping Guide for a Better World". It's published by an organization that I helped to found in 1970. This enables any shopper to go into a supermarket, and based on what their values are, whether they are concerned about the environment, or militarism, or whatever it is, they can look up for every single product and brand name and see whether the company is a good corporate citizen. We used to be a struggling little organization and now this has become our profit centre. We can't keep up with the demand for this little book. We've sold 300,000 of them in the past year.

So we know that these values are all shifting now and I don't have to tell you that since Earth Day, 87 percent (this is an American statistic) of adult Americans, of all socio-economic classes, now define themselves as environmentalists. So politicians now in the U.S. and Western Europe absolutely equate environmental issues with motherhood and re-election.

I was in Europe a couple of months ago and the big thing there is green taxes. All of the politicians over there are rushing to put in the next green tax type of proposal. Now taxes are supposed to be unpopular, but the Social Democratic Party of Germany has a very interesting twist on this. They realized that all you have to do is to make your green taxes revenue-neutral. They decided what they are going to do is they are going to sell green taxes as an income tax cut. All they'll do is to shift the burden away from the income tax onto depletion taxes, carbon taxes and pollution taxes. So the voters are going to love this because all they'll see is that they get an income tax cut. Ultimately, the green taxes will result in increased cost of living, but these costs come along later. So it's really interesting to see this kind of thinking going on. At the local level, you are getting the same kind of discussion about quality of life.

This next chart (Exhibit 2-15) is a quality of life index which has been developed for the City of Jacksonville in Florida. It's really based on this whole new approach to economic development. In Florida, I have been serving, for the past three years on a Commission that reports to the Legislature on the future of the State. We began to realize that if we went on with the old style economic development model we would be in trouble. The business climate models that accounting firms like Grant Thornton used to put out which I basically call the "Plantation Model" - cheap land, cheap labour, low taxes, few environmental regulations, and right-to-work laws - they always used to tell us made a good business climate. Suddenly, of course, in a global labour and capital market, this put us in competition with Haiti, where people are willing to work for 50¢ a day! Suddenly the politicians got it; they realized that you can't possibly sell this kind of economic development and get re-elected. So we turned the whole thinking around in the Florida Legislature toward the idea that we had to invest in our people to raise the education levels. Also we had to invest in the environment, which is, of course, basically our drawing card. The quality of life indicators in Jacksonville, Florida, now have only one category left which is a purely economic category. The other categories are public safety, health, education, natural environment, mobility, Government, social environment, and culture and research.

I think, just to finish, operationalizing sustainable economies has to have three levels to it. First level is correcting the macro statistics, the national accounts and the GNP along the lines I think that the Venezuelans are going. The second, of course, has to be the micro-indicators, and the corporate social audits. The kinds of things being developed in the Valdez Principles, that have just been promulgated by a group that I am associated with called the "Social Investment Forum". The third level, of course, is the consumer. That includes purchasing products displaying the "green" environmentally-friendly product seals.

The key, to managing these complex societies undergoing this tremendous amount of change, has got to be feedback. I know that B.C. Hydro has got that message. It's not only feedback in full-cost prices and life-cycle costing or even the feedback that one gets in votes, which is, of course, why democracies are spreading all around the world; but also, the other feedbacks that can keep markets functioning efficiently. Mass media, crusading civic groups, good regulations, and most of all, cultural norms and ethical concerns for our children and our future. Thank you.

Questions Directed to Dr. Henderson

In your opinion what does the future hold for resource-dependent economies such as B.C., especially timber and fibre economies?

Dr. Henderson

Well, I really think that most places I go, people realize that extractive economies are very fragile. I was in Alaska about three weeks ago and they are dealing with this whole thing right now. Where is their next economic boom coming from? They will be going into a bust cycle eventually with their oil-based economy and there is talk about, "Well you know, maybe we can get a gas pipeline going." But there is also a lot of good sensible talk going on in Alaska about how to diversify and really how to add much more value to their resources. My view is that the need is to try to develop a home-grown economy because until there is some kind of level playing field out there in the global fast lane, it will be a very difficult game to play, particularly for local politicians, because there is no way of second-guessing what's going on out there.

If you are trying to lure some corporation from Korea or wherever to build an assembly plant, even this kind of economy is tremendously vulnerable because all of those global corporations have got exquisite computer programs. They can punch a couple of buttons and tell on a daily basis which foolish nation state is now offering them 37 percent return on investment and all the tax breaks. As soon as they've used them up, of course, they are off to the next place.

So I really think that the whole approach of venture capital should be to fertilize local businesses and giving time to really figure out what is the new set of comparative advantages out there. They have to be niche strategies, in other words, they have to be really looking at what any particular area can offer the world that is really unique. An example might be the Netherlands which has one bedrock export that nobody can touch them at, and that is the hardware and software of dyking out the sea. They sell that all over the world. They've had 2000 years of experience and no one tries to compete with them.

Or, you know, sometimes when I am home in Britain, I talk to Government people there and sort of ask them rhetorically, what was Britain's most successful export since World War II? Obviously to me, the answer is eccentricity. That's a wonderful export. If you actually think of it, all of the rock music and the punk fashions and all of that. Yet, meanwhile Britain was subsidizing Mr. Delorian and his silly automobile. I think it's a matter of completely thinking through the whole thing again.

Question

What do you regard as the top three energy issues of the 1990s?

Dr. Henderson

Well, first of all I would say conservation is the "numero uno" issue because we haven't begun to plumb all that's available with conservation. The second issue, I think, is probably investment in solar and alternative energy sources because I think there is going to be a tremendous amount of innovation in this area. Whether it's going to be hydrogen or whether it's going to be fuel cells, I think that it's a whole new ball game from what it was in the seventies when we were first interested in all of this. I would say the third issue is partly to do with lifestyles, but what it's really to do with is redesigning communities so that all of these issues about recycling, about building efficiency and adopting as many passive kinds of systems as we can, and also the transportation sector. With all those kinds of rethinking and redesign, we should also be concerned with long-term land use and management of growth issues.

Question

As long-range environmental policies require long-term commitment, how is the present four- or five-year parliamentary democratic system going to be effective? Like the NIMBY (not in my backyard) syndrome, the politicians have their NIMTOF (not in my term of office) because it is unlikely that any Government will take any necessary but unpopular measures to protect the environment. Should the four- or five-year government system be changed?

Dr. Henderson

Well, in a sense I am going to dodge this question because I am an American citizen now. I think that this basic issue of terms of office in all countries, not just this one, is how we are going to get the political system geared toward long-term decisions? I think that this is something all of us are struggling with. I have no magic answer for it other than there is no way we are going to repeal democracies and we are out there now trying to get the public involved in these debates. To me, we have already moved from democracy to "media-ocracy", in almost every country. In advanced industrial countries the mass media, and they are still very mediocre, will in a sense take all these issues to the public. The issues are going to have to be debated with mass media. I think it's really the only way. Thank you very much.

Thanks to Dr. Hazel Henderson by Larry Bell

Well Dr. Henderson, I think we have all been challenged by your very insightful and comprehensive review of some of the issues that are facing us. One that did not get the emphasis in your talk, or quite frankly in others, is the whole question of world population growth.

I had the occasion to be both in Bangkok and Karachi over the last couple of months and there I saw cities that had populations of less than a million in 1940 but which well exceed 10 million today. They have very little infrastructure and enormous air pollution. I think that perhaps one of the things that we need all to worry about is the fact that poverty is perhaps one of the great destroyers of the environment.

I thought I would offer a couple of other observations. First, on global interdependence. I had the opportunity to have to borrow an awful lot of money during the globalization of the international financial market. I remember when I started a new job, the Japanese bankers would come in. There would be three or four of them. One of them could just barely get by in English. There was a lot of nodding but the one thing that they needed was a photograph. One fellow always had a camera and he had to have a picture to take back to their sales manager in Japan and prove that they had actually met with the Deputy Ministers of Finance of British Columbia and Alberta, etc. Well it didn't take five years until a manager of Canadian assets in one of those companies, made a decision and, as a result, dropped the value of the Canadian dollar by a cent in three days. That's over a five-year period so this whole question of interdependence and of globalization is just undoubtedly going on at an enormous pace.

Today in our society we are seeing the beginnings of a marriage between economics and the environment. Somehow these two have to come together. Dr. Henderson, you talked about the market and the commons, and the new economics, and I guess there has to be some sort of blend of these three. I was pleased with some of the things that you talked about at the end of your speech because although perhaps we failed, and indeed we have failed in many instances to look after our environment; but from little I have seen of the "command and control" economies they certainly drew down their ecological balance sheet even more than we have, by a significant degree.

Some of the tools that you talked about for policy makers, of course, anybody in a major corporation would recognize them right away. They are all tools that we use in a corporate sense, but don't use it in a governmental and economic sense. What I thought when you were talking was "Where do you draw the boundaries?" That's the biggest issue. That's quite clear. I have an issue with respect to air; we are planning a new office building and you have no idea of how difficult it is to have a building where the windows can be opened. It's nigh on impossible.

I clearly related to your complex feedback model and the need for chaos theoreticians. That seems to be my job description. In terms of Hydro itself. I can say that we have begun to recycle paper in our head office. We used to just recycle our computer paper, and I used to be embarrassed to say how many tons went out of the office in a month as waste paper. We now have an equal amount coming out of personal waste paper baskets, and 80 to 90 percent of my paper, which I don't want weighed, goes into recycling. There's an enormous tonnage coming out of head office - around 30 tons a month, and if anything I am erring on the downside.

It's interesting you mentioned the Calvert Fund. I had the opportunity to establish the Ethical Growth Fund in Canada. We modelled it after the Calvert Fund and, in fact, I visited Calvert and talked to them. We started from basic market principles. There was a niche and there were people who wanted to do this. So why don't we provide that service? Indeed we did, and it just so happens that it's quite to your advantage not to invest where people are rioting or where you are polluting, and the government is levying rather enormous fines, or threatening to shut your factories down. Indeed, the Ethical Growth Fund had the best growth rate of a balanced fund in Canada over the last two years.

One of the real concerns is how to get there from here? What kinds of adjustments? The "who goes first" syndrome? When I talk to businessmen about my concern about air emission levels in Greater Vancouver, that is a personal interest of mine, they suffer from this "syndrome". These people operate in competitive markets with very slim profit margins. "Who goes first" and what kind of adjustments have to be made? How do we tackle it on a global basis with the level of international trade? This is a real perplexing question and I think that we are going to have to work very hard and wish Mr. Maurice Strong a lot of good luck and success in putting together the United Nations Conference in 1992 which will hopefully tackle some of these issues.

I just wanted to conclude by indicating to you that achieving sustainable development will involve changes in lifestyles. The real difficulty that I see in all of this is for us to stop preaching to each other, and looking for big targets with deep pockets and start thinking about ourselves and how we behave as individuals. I had great fun at public meetings to discuss the routing of a new transmission line through Whistler. We haven't had a major line built for 22 years down to the Lower Mainland. People can't link the fact of the need to build this line with the fact that the ski lifts are driven by electricity. Every hotel has a heated swimming pool and a jacuzzi. People just can't make those linkages. We have got to make that personal linkage and personal commitment and realize that all these things are not cost-free and that it's not somebody else that's doing it. We've met the enemy, and he is us.

You will be interested, Dr. Henderson, that a staff initiative promoted an electric energy-saving competition between two small communities in this Province. I would say the population in both instances was about 1500 or 2000. Their climates are roughly the same, and it was easy for us to meter how much electricity was being used in these two communities. We had a Power Smart competition between Nakusp and Golden. Some of you will know where they are. Over a month, the winner saved 12 percent, the other one was just over eight percent. What was astounding was that a certain retail outlet had a saving well in excess of 20 percent, and a school and a hospital each had savings of over 20 percent. You know it's not high-tech, it's just caring. It's just taking a little bit of personal time to shut the lights off. I think that if we all start to make those contributions, the major challenges that Dr. Henderson so ably outlined for us, have a chance of being realized, and we have a chance of having a globe that our children can live in.

Presentation to Dr. Henderson

Dr. Henderson, thank you very, very much for coming here.

I would now like to introduce Mr. Randy Adams, also known as Eagle Wind. He is a master carver with 25 years experience as a native artist whose work has travelled throughout the world. Presently he owns Eagle Wind Native Arts in Prince George and has been extraordinarily successful. What we thought we would like to leave with you, Dr. Henderson, is a gift from us which is a specially-commissioned hand-carved gift depicting northwest native legends. So, Randy, if you would please come up here.

Randy Adams

I was asked to give the story of the legend of the bowl. As I grew up with the old people, they taught us respect. They taught us respect for ourselves, respect for the things of the earth, and respect for the young as well as the old. Respect has always been the key to our culture. When we were discussing the things that they wanted for me to carve I came up with the idea of a potlatch bowl and while I am giving the story I would like you to unwrap the parcel.

Dr. Henderson

Oh that's wonderful! I've written about potlatch and I've written in politics of the solar age about how we need to refer back to the value system of lifestyles of many native people so this I will truly treasure and I will send you a copy of my book and mark the passages where I talk about potlatch.

Randy Adams

On the bowl we have two different designs; we have the eagle, and we have the salmon. Many years ago our people on the west had a ceremony when the first salmon used to come up in the spring time. They took the salmon and cooked it over an open fire and had all the people of the community there. They used to sing a dirge, "We are honey now, we are honey now", and they would feed the people of the village. When it was over, they would take care to leave the head, the backbone, and the tail intact and they would take the salmon and put it back in the river. The old people said, that the spirit of the salmon would go back down the river and go back to the spirit world and tell the rest of the salmon that these people up there respected us so we are going to return and come back every year because they respected us. That's the story of our people. Thank you.

Dr. Henderson

Thank you very much.

Conclusion of Opening Session, Chris Boatman

Well ladies and gentlemen, that concludes our opening session. I'm sure that what you have heard will give you a lot of food for thought for this evening and get us off to a great start for the two days of hard work we have ahead of us. A reception will follow in the room behind me. I'd like to invite you all to join us. I believe we will start here at 8:30 tomorrow morning so I will now close this session. Thank you very much.

QUESTIONS ANSWERED BY DR. HAZEL HENDERSON AFTER THE FORUM

Question

Do you see any hope for humanity's survival? (In anything like its present societies.)

Hazel Henderson

Well, the human species is certainly coming up to "Graduation Day" on this planet. We will either learn to change our values and behaviour to fit Nature's functioning or the Earth will continue its evolution without us.

Question

I have a Utopian Vision of an equilibrium society based upon the following four principles:

(a) A stable human population.
(b) A constant stock of material goods.
(c) A minimum throughput of material resources (i.e. maximum recycling).
(d) A maximum proportion of our energy needs derived from renewable resources.

To what extent do you think this is reasonable and proper; and how long might it take?

Hazel Henderson

I find the four principles of your Utopian Vision very much in accordance with my own. I might just add that human creativity and knowledge are truly unlimited resources and we can all keep right on growing in wisdom, understanding and compassion, as well as in our enjoyment of the great creation of Nature. But I don't know how long it will take for us to get there.

Question

If we do agree on the answer to the question "What is valuable?", what are we going to use as a measuring stick? Won't we always be faced with measurement and management problems?

Hazel Henderson

I hope that we never all fully agree on what is valuable. The many different interpretations of what is valuable and important in life are what makes each culture unique. Hopefully, we can all learn to savour the diversity of each other's cultures, just as we do each other's art, food and music. The purpose of the "Country Futures Indicators" (trademark pending) that I am developing, is precisely that they will be crafted and operationalized around what each culture, region, city or village democratically decide is valuable. These new indicators will not be highly aggregated, swallowing up all the apples and oranges in one coefficient, such as money-denominated, per-capita GNP growth, but will instead, be "un-bundled" into all the many dimensions: from purchasing power parity, education, health, public services, to unpaid production, self-employment, energy/GDP ratios, military/civilian budget ratios, air and water quality, species loss and democratic participation rates. Each country will have a different "spin" on the importance of all these factors, as well as others that are quite unique or country-specific, rather than country-comparable.

Question

How can developed countries encourage population control in Third World countries when they are exporting machinery, consumer goods, etc., which drives the Third World even deeper into debt?

Hazel Henderson

They can't, with any real credibility. This is one of the new global issues of the 1990s. We might cal it "green geo-politics". The upcoming conferences in Bergen, Norway, and Brazil 1992 will begin the hard global bargaining and negotiating that must resolve these issues. My hope is that the Northern Hemisphere industrial countries will realize that they must take the first steps, and show good faith by reducing their per-capita consumption of energy and raw materials -- since so many of their problems relate to over-consumption and inequitable sharing within their societies.

Exhibit 2-1

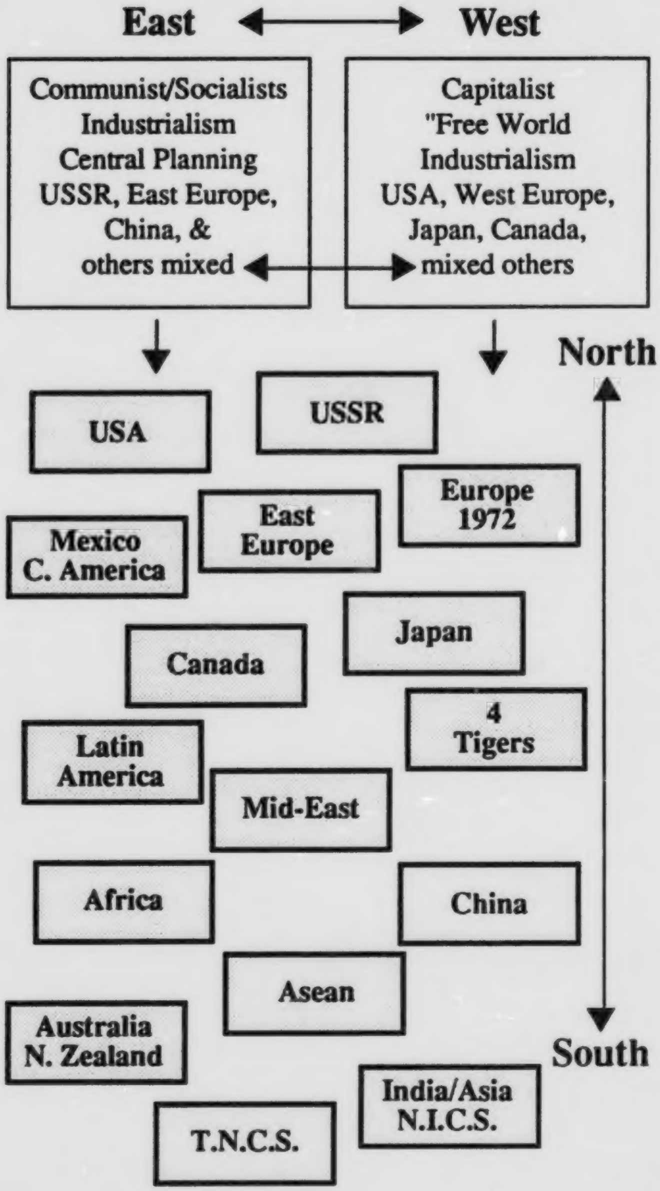
Emerging Era of Global Interdependence Geo-Political Realignments

1945 — 1988
"Cold War Era"
Super-powers
Bi-polar world

GAME:
"Mutually Assured Destruction"
Military confrontation ideological struggle for "3rd World"

1988 — ?
Multi-polar World
Super-powers decline
Japan won Cold War
MEGA Trade Blocs

GAME:
"Mutually Assured Sustainable Development"
New national strategies
Multiple ideological struggles over approaches to "development"
"Progress" rethinking economics beyond left and right-convergence
Green movements



East ↔ **West**

Communist/Socialists
Industrialism
Central Planning
USSR, East Europe,
China, &
others mixed

Capitalist
"Free World
Industrialism
USA, West Europe,
Japan, Canada,
mixed others

North

USA

USSR

Europe 1972

Mexico C. America

East Europe

Japan

Canada

4 Tigers

Latin America

Mid-East

Africa

China

Asean

Australia N. Zealand

South

India/Asia N.I.C.S.

T.N.C.S.

Exhibit 2-2

From Economics To: Systems View

Interactive Productive System of an Industrial Society (Three-Layer Cake with Icing)

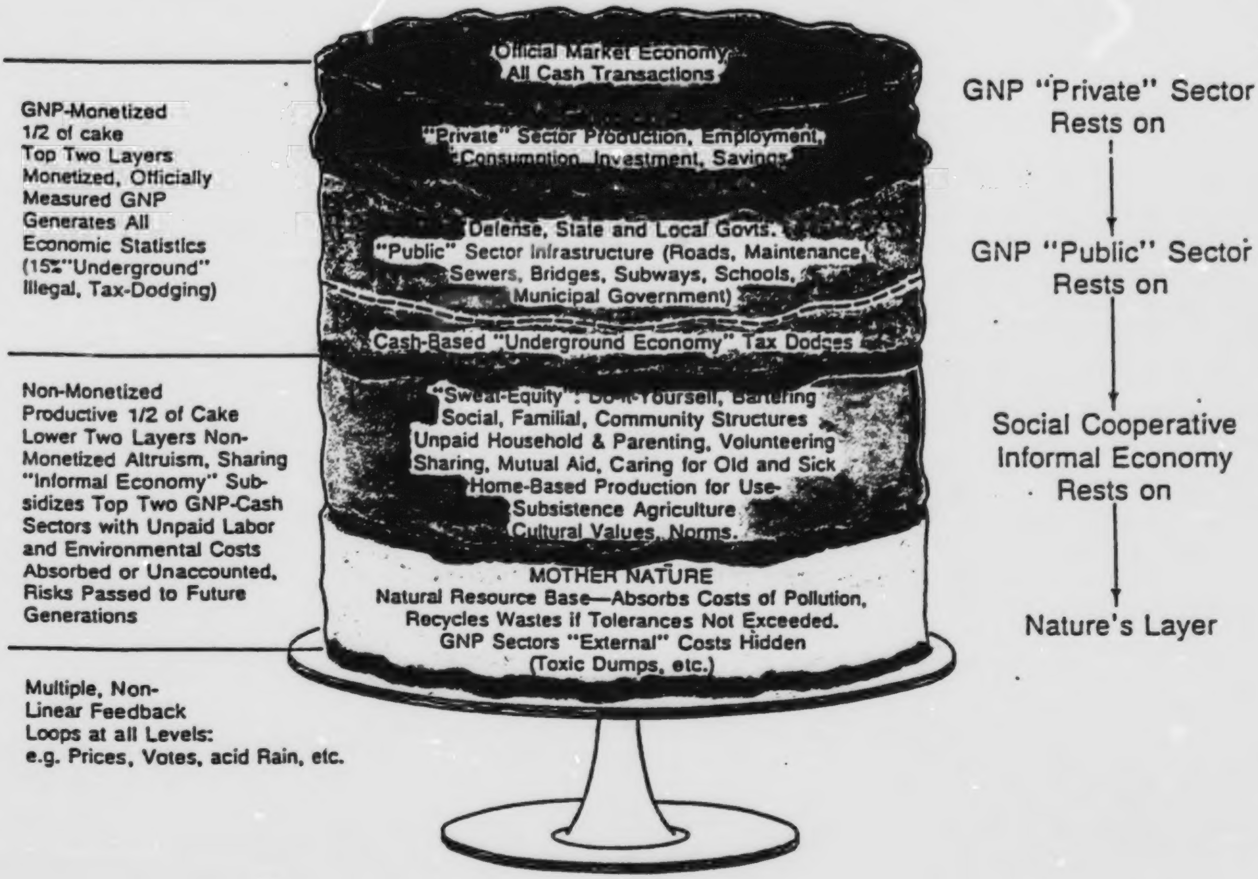

Official Market Economy
All Cash Transactions
"Private" Sector Production, Employment,
Consumption, Investment, Savings
Defense, State and Local Govts.
"Public" Sector Infrastructure (Roads, Maintenance,
Sewers, Bridges, Subways, Schools,
Municipal Government)
Cash-Based "Underground Economy" Tax Dodges
"Sweat-Equity": Do-It-Yourself, Bartering
Social, Familial, Community Structures
Unpaid Household & Parenting, Volunteering
Sharing, Mutual Aid, Caring for Old and Sick
Home-Based Production for Use-
Subsistence Agriculture
Cultural Values, Norms.
MOTHER NATURE
Natural Resource Base—Absorbs Costs of Pollution,
Recycles Wastes if Tolerances Not Exceeded.
GNP Sectors "External" Costs Hidden
(Toxic Dumps, etc.)
GNP-Monetized 1/2 of cake Top Two Layers Monetized, Officially Measured GNP Generates All Economic Statistics (15%"Underground" Illegal, Tax-Dodging)
Non-Monetized Productive 1/2 of Cake Lower Two Layers Non-Monetized Altruism, Sharing "Informal Economy" Subsidizes Top Two GNP-Cash Sectors with Unpaid Labor and Environmental Costs Absorbed or Unaccounted, Risks Passed to Future Generations
Multiple, Non-Linear Feedback Loops at all Levels: e.g. Prices, Votes, acid Rain, etc.
GNP "Private" Sector Rests on
GNP "Public" Sector Rests on
Social Cooperative Informal Economy Rests on
Nature's Layer

Exhibit 2-3

Differing Perceptions, Assumptions, Forecasting Styles between Economists and Futurists

ECONOMISTS	FUTURISTS
Forecast from past date, extrapolating trends	Construct "What If?" scenarios; trends are not destiny
Now also use optimistic, pessimistic forecasts	Identify "Preferred Futures" — plot trends fro cross-impacts
Change seen as dis-equilibrium (i.e. equilibrium assumed) — all other things equal "normal" conditions will return	Fundamental change assumed (transformation assumed) — no such thing as "normal" conditions in complex systems
Reactive (invisible hand assumed to control)	Pro-active (focus on human choices and responsibilities)
Linear reasoning; reversible models	Non-linear reasoning; irreversible models, evolutionary
Inorganic system models	Living system, organic models
Focus on "hard" sciences and data	Focus on life sciences, social sciences, "soft", fuzzy data, indeterminacy
Deterministic, reductionist, analytical	Holistic, synthesis, seeks synergy
Short-term focus (i.e. discount rates in cost/benefit analysis)	Long-term focus, inter-generational costs, benefits and trade offs
Data on non-economic, non-monetarized sectors seen as "externalities" (i.e. voluntary, community sectors, unpaid production, environmental resources)	Includes data on social, voluntary unpaid productivity, changing values, lifestyles, environmental conditions; maps contexts, external variables (use post economic models: technology assessment, environmental impact, social impact studies)
Methods lend to amplify existing trends (i.e. Wall Street psychology)	Methods "contrarian" (i.e. look for anomalies, check biases in perceptions, cultural norms)
"Herd instinct" in investing, technologies, economic development	Identify potentialities that are latent
Entrepreneurial when "market" is identified	Socially entrepreneurial (Schwartz) (i.e. envision future needs, create markets)
Precise, quantitative forecasts (i.e. gross national production for next quarter of year; annual focus)	Qualitative focus (i.e. year 2000 studies, anticipatory democracy), data from multiple sources, plot interacting variables, trends in long-term global contexts

Exhibit 2-4

Emerging Change Models

Earth System	(N.A.S.A. Program on Global Change International Division, Washington, DC, 20546) (inter-disciplinary: plate tectonics, biogeochemical and solar-driven processes, strato and meso-sphere)
Catastrophe Mathematics	(RENE THOM, Structural Stability and Morphogenesis, Paris 1972) MODELS AT LEAST SEVEN MODES IN WHICH SYSTEMS CHANGE THEIR STATES
Cybernetic Models	HOMEOSTATASIS AND METAMORPHOSIS governed by feedbacks, negative and positive (MAGOROH MARUYAMA, "Paradigmatology" in H. Henderson, Politics of Solar Age, 1981)
Order through Fluctuation Models	(ILYA PRIGOGINE, "From Being to Becoming", San Francisco, 1980)
Chaos Theory Based on Attractors	(RALPH ABRAHAM, Dynamics: The Geometry of Behavior, Santa Cruz, 1984. Point, periodic and chaotic Attractors can "magnetise" systems into new states.

Exhibit 2-5

Emerging Era of Global Inter-dependence

(New playing field of globalization processes, re-align and re-structurings)

Driving forces: six great globalizations:

(1) Globalization of industrialism/technology
(2) Globalization of finance/communication/information (round-the-clock trading roller coaster)
(3) Globalization of employment, work, migration
(4) Globalization of human effects on biosphere-pollution, etc.
(5) Globalization of militarization
($) trillion arms sales, nuclear, chemical weapons)
(6) Globalization of consumption, culture, media-ddriven world citizenship movements

And 7th Globalization feedbacks:
Interactions
Responses
Re-alignments
Re-structurings

Exhibit 2-6

Emerging Era of Global Interdependence

6 Globalizations + Feedbacks
Interaction — Responses

- Loss of National Sovereignty
- Acceleration and
- Irreversibility of Changes

Requiring a paradigm shift in knowledge/research methods

From focus on exactitude, static equilibrium, classical reductionism

Toward focus on research methods/policy tools based on systems view: Dynamic, non-linear, probabilistic, feedback driven models of dis-equilibrium (e.g. chaos theories)

Exhibit 2-7

Exploring the Evolving Global Playing Field

New Economic Debates about
- What is valuable (e.g. information)
- **What, when, why, where** and **how** to regulate/deregulate

All theories in question:

e.g. USSR "Perestroika"?
USA "decline" deficits, deregulation?
China "economic reform"?
N.I.C.S. and Thrid World: Who to follow?

NOTE: All "economies" are sets of rules (derived from cultural norms) (i.e. game theories, decision and control theories)

Economics (left and right) see various regulatory strategies for:

Markets: — Open system
Private sector
Individual competition
Adam Smith's Rules: win-lose

Commons: Closed system
Indivisable resources (air)
Public sector
Cooperative rules: treaties
agreements, consortia, win-win

Exhibit 2-8

Relative Decline of U.S.A. in the World

Some overlooked fundamentals:

- **INVESTMENT LAG IN "HUMAN CAPITAL" RESOURCES** (Education, re training, children)
- **ENERGY SECTOR STILL RELATIVELY INEFFICIENT** (Energy/GNP ratio vs. Japan, Germany, etc.)
- **HEALTH SECTOR** (Inefficient use of huge investment, 12% of GNP vs. performance of other countries, e.g. Denmark, Netherlands, Canada, Sweden)
- **"WASTE" MANAGEMENT** (Costly focus on "Disposal" rather than recycling back into production, (Japan recycles over 50% of "waste")
- **ENVIRONMENTAL COSTS** and resource depletion rates too high (Inefficient subsidies still leading to erroneous pricing of resources)
- **AGING, DECAYING, INEFFICIENT INFRASTRUCTURE**
- **INEFFICIENT TAX CODE** (Subsidizes waste, resource depletion, over-investment in automation and plant relocation)
- **CONSUMER-ORIENTED CULTURE** (Low savings rate)
- **SHORT TERM VIEW PREVAILS** in business and politics, as well as culture
- **PRODUCTIVITY IN THE SERVICES SECTOR LAGS** behind Japan, Germany, etc. (U.S. trade in services fell into deficit in 2nd quarter of 1989 for the first time due to more earnings of overseas investors in the U.S. Now an indicator of U.S. net debtor status in world economy)

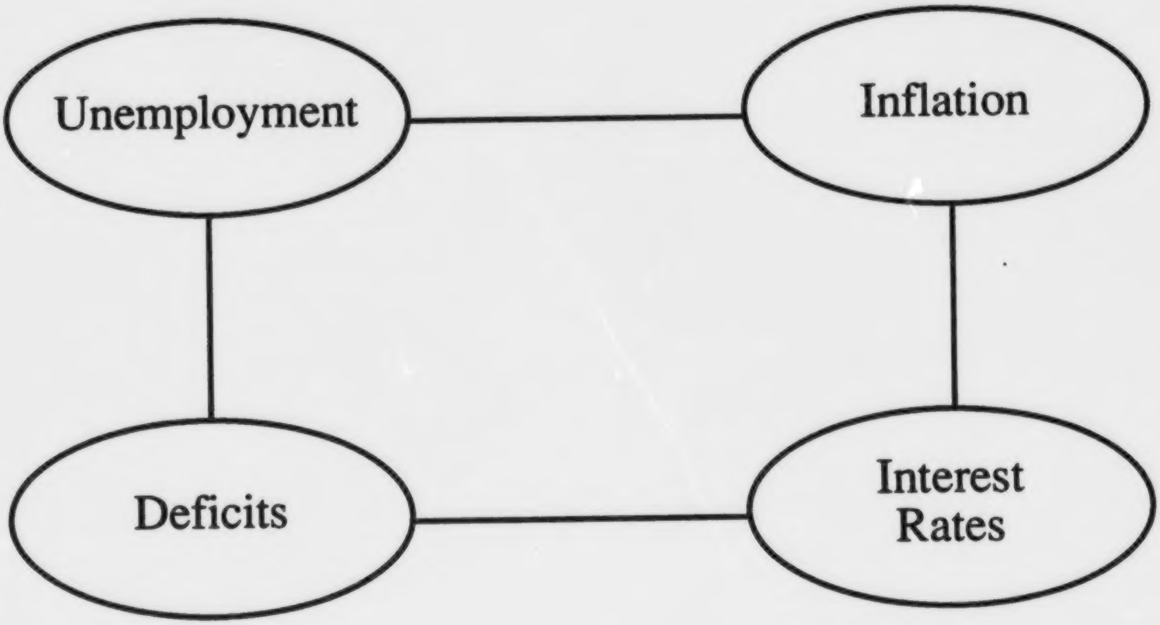
Exhibit 2-9

A "Conserver Society" Blueprint for Canada's Future?

Conservation Scenario	Scenario	Underlying Theme	Description
CS_0	**Scenario of the status quo**	"Doing more with more"	- mass -consumption society - uncontrolled growth
CS_1	**Scenario of "growth with conservation"**	"Doing more with less"	- increase efficiency - waste reduction - technological growth
CS_2	The high-level stable-state scenario	"Doing the same with less"	- achievement of stability with affluence - reduction of inequalities
CS_3	The Buddhist Scenario	"Doing less with less" "Rejection of the mass-consumption society"	- decentralized economy - soft technology - value-change
CS_{-1}	Scenario of the Squander Society	"Doing less with more" "Extravagance"	- dedication to mass-consumption and waste - obsolescence and self-destruction of consumer goods

Exhibit 2-10

The Economic View of Global Economy



Unemployment

Inflation

Deficits

Interest Rates

Exhibit 2-11

A System View of the Global "Vicious Circle" Economy
(Fast Feedback Loops)

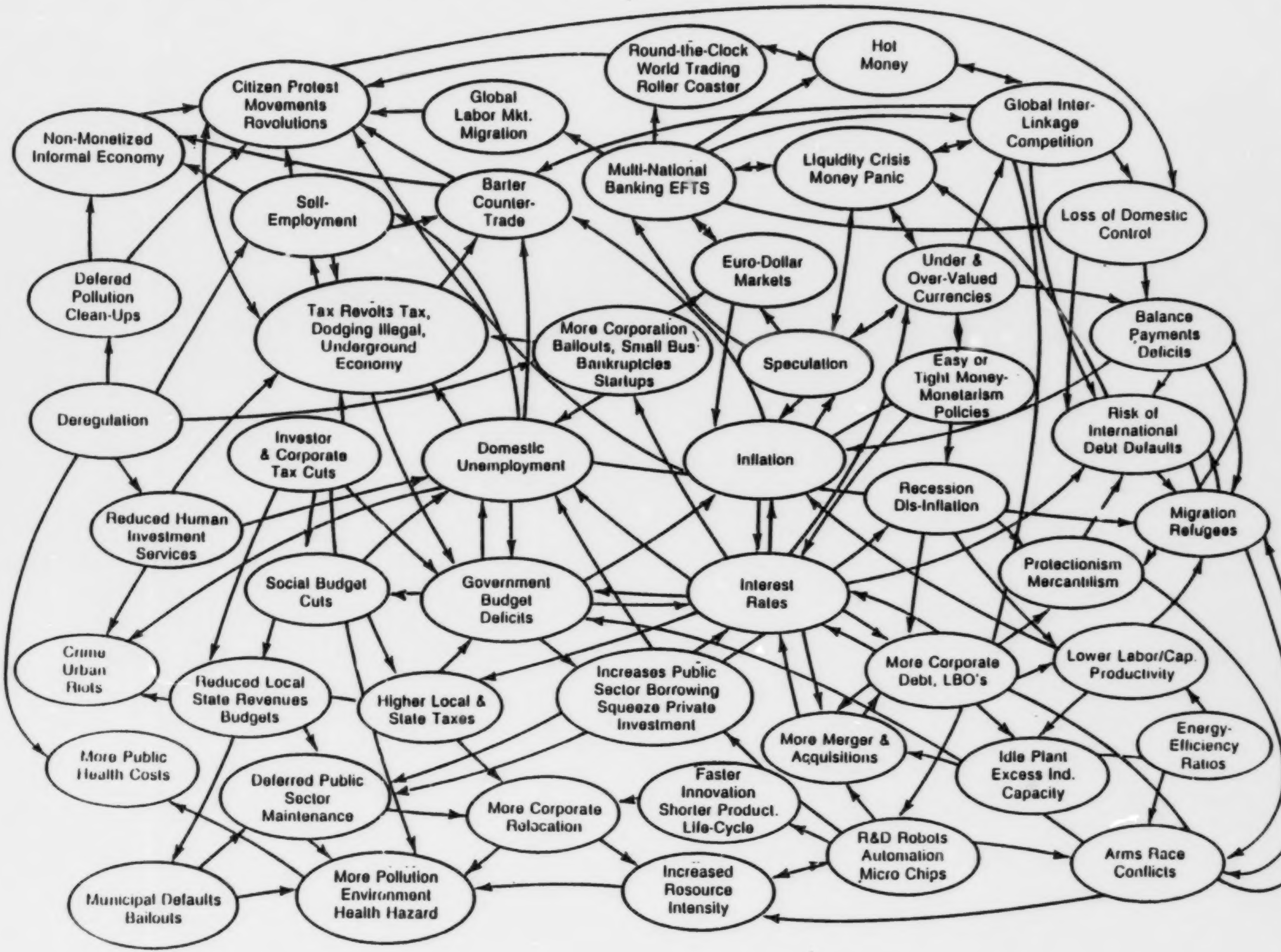

Round-the-Clock World Trading Roller Coaster
Hot Money
Citizen Protest Movements Revolutions
Global Labor Mkt. Migration
Global Inter-Linkage Competition
Non-Monetized Informal Economy
Multi-National Banking EFTS
Liquidity Crisis Money Panic
Self-Employment
Barter Counter-Trade
Loss of Domestic Control
Euro-Dollar Markets
Under & Over-Valued Currencies
Defered Pollution Clean-Ups
Tax Revolts Tax, Dodging Illegal, Underground Economy
More Corporation Bailouts, Small Bus. Bankruptcies Startups
Speculation
Easy or Tight Money-Monetarism Policies
Balance Payments Deficits
Deregulation
Investor & Corporate Tax Cuts
Domestic Unemployment
Inflation
Risk of International Debt Defaults
Recession Dis-Inflation
Reduced Human Investment Services
Migration Refugees
Protectionism Mercantilism
Social Budget Cuts
Government Budget Deficits
Interest Rates
Crime Urban Riots
Reduced Local State Revenues Budgets
Higher Local & State Taxes
Increases Public Sector Borrowing Squeeze Private Investment
More Corporate Debt, LBO's
Lower Labor/Cap. Productivity
More Public Health Costs
Deferred Public Sector Maintenance
More Corporate Relocation
Faster Innovation Shorter Product. Life-Cycle
More Merger & Acquisitions
Idle Plant Excess Ind. Capacity
Energy-Efficiency Ratios
R&D Robots Automation Micro Chips
Arms Race Conflicts
Municipal Defaults Bailouts
More Pollution Environment Health Hazard
Increased Resource Intensity

Exhibit 2-12

Country Futures Indicators

(Beyond money-denominated, per-capita averaged growth of GNP)

Re-Formulated GNP to Correct Errors and Provide More Information Includes:

- PURCHASING POWER PARITY (PPP) corrects for currency fluctuation
- INCOME DISTRIBUTION — is the poverty gap widening or narrowing?
- COMMUNITY BASED ACCOUNTING to complement current enterprise-based accounting
- INFORMAL AND HOUSEHOLD SECTOR PRODUCTION measures productive hours worked (paid and unpaid)
- DEDUCTION OF SOCIAL AND ENVIRONMENTAL COSTS a "net" accounting which helps avoid double-counting
- ACCOUNT FOR DEPLETION OF NON-RENEWABLE RESOURCES
- ENERGY INPUT/GDP RATIO measure of energy-efficiency, recycling
- MILITARY/CIVILIAN BUDGET RATIO effectiveness of govt./diplomatic skills
- CAPITAL ASSET ACCOUNTS FOR BUILT INFRASTRUCTURE AND PUBLIC RESOURCES

Complementary Indicators of Progress Toward Society Goals:

- EDUCATION — literacy levels, school dropout and repetion rates
- HEALTH — infant mortality, low-birth-weight, weight/height/age
- NUTRITION — daily caloric intake, etc.
- BASIC SERVICES — water, sanitation, telephones, electrification, etc.
- SHELTER
- CHILD DEVELOPMENT
- POLITICAL PARTICIPATION AND DEMOCRATIC PROCESS
- STATUS OF MINORITY AND ETHNIC POPULATIONS AND WOMEN
- AIR AND WATER QUALITY AND ENVIRONMENTAL POLLUTION LEVELS — air pollution in urban areas
- ENVIRONMENTAL RESOURCE DEPLETION — hectares of land, forecst lost annually
- BIO DIVERSITY AND SPECIES LOSS
- CULTURE, RECREATIONAL RESOURCES

Exhibit 2-13

Values Bifurcating in Post-Industrial Societies

Short View (Peaking of Old Values)	Long View (Emerging Values)
Reductionist, Focus on "Micro Rigorous" Research, Quantitative Heirarchical, Dominator	Integrative, Larger Contexts, Quantitative Participatory, Partnership
Greed, Individualistic, Competitive	Concern for Community, Cooperation
Speculation, Paper Asset Shuffling	Socially Responsible Investing
Borrowing, Leveraged Buyouts, etc. Debt Financing, Credit Cards	"Valdez" Principles, Sullivan and Other Investing Criteria Investing in People
Budget and Trade Deficits, International Debt	Increase Savings Rate, Balance Budget
Consumption Values and Addictions (Drugs, Food, Shopping, Sex, Money)	Frugality, Search for "Inner" Satisfactions and Personal Growth
"Lifestyles of the Rich and Famous" Advertising Geared to Infantile Desires	Shopping Guides for a Better World "ECO Labelled" Products
Crisis Model of Problem-Solving	Pro-Active Preventive Problem Identification, Early Warning
"Band Aid" Remedies, Technological "Fixes" Gross National Product, and Macro Economics Aggregates are Sufficient to Measure Progress as Increase in Per Capita Income	Proliferation of New Indicators of Major Social Trends, Geared to Provide Feedback to Specific Social Goals
Little Environmental Concern	Rise of Green Parties and Movements
Non Ratification of Law of the Sea Treaty	Treaty of Montreal, etc.
Govt. Investment in Armaments, Hardware Tax Code Subsidizes Resource Depletion	Interest in Negotiations, Conflict Resolution, Diplomacy, Citizen Diplomat
"Business as Usual", "Economism" has Won	Concern and Debate Over Ethics, Values

Exhibit 2-14

The Re-structuring United States Economy

Obsolescent Sectors (Unsustainable, Entropic)

Industries, companies based on heavy use of non renewable energy and materials; bureaucratic, large less-flexible organizations.

Non recyclable products; packaging; military contracting; cost-plus mentality; products involving toxic, non biodegradables; polluting materials; throwaway items; planned obsolescence.
Chemical pesticides; inorganic fertilizers.
Heavy farm equipment.

Polluting, inefficient capital equipment, process machinery, and processing systems.
Extractive industries with low value-added.
Fossil fuels, nuclear power generation.

High-tech hospital based medical care.

Highly processed foods.

Advertising encouraging waste and polluting practices.

Shopping centre developers.

Emerging Sectors (Sustainable, Low Entrophy)

Industries based on efficient use of energy and materials and human skills.
Entrepreneurial, small, and flexible.

Recyclable products; re-manufacturing; conservation, innovation.
Fuel efficient motors, cars, mass transit.
Solar, renewable energy systems.
Communications, information services.

Infrastructure, education, training.

Space communications; satellites.
Peace keeping; surveillance of treaties
Efficient capital equipment, and processes.
Restorative industries, re-forestation, desert greening, water quality management.
Health promotion and disease prevention.

Organic agriculture, low till systems.

Integrated pest management.
Pollution control clean up and prevention.

Natural foods.

Waste recycling and reuse.

Community design and planning.

"Caring" sector: Day care, elder care, etc.

Exhibit 2-15 (Sheet 1 of 2)

Life in Jacksonville: Quality Indicators for Progress
1983-1988

All dollar values have been adjusted for inflation using 1988 as the base year

THE ECONOMY

includes individual economic well-being and community economic health

	1983	1984	1985	1986	1987	1988
Average unemployment rate	7.9%	5.6%	5.1%	5.3%	5.3%	5.3%
Average black unemployment rate	13.4%	9.8%	9.0%	9.4%	9.4%	9.4%
Average teenage unemployment rate	25.1%	19.0%	17.6%	18.1%	15.2%	17.7%
*Effective buying income per capita	$11,479	$11,143	$12,498	$12,748	$13,315	$12,477
*Retail sales per capita	$6,575	$7,017	$6,924	$6,905	$7,018	$7,119
*Average price of prev. owned, single fam. home	$65,250	$67,792	$68,175	$70,930	$74,451	$80,052
*Revenue generated by the Bed Tax	$1.62 mil	$2.71 mil	$2.94 mil	$2.99 mil.	$3.26 mil	$3.34 mil
*Total taxable value of real estate	$6.13 bil	$6.64 bil	$7.51 bil	$8.84 bil.	$9.77 bil.	$11.91 bil
*Cost of 1,000 kw hours of electricity (JEA)	$89.36	$88.46	$84.33	$74.23	$71.34	$64.70
New housing starts	7,294	8,400	10,143	9,957	7,676	7,162

PUBLIC SAFETY

includes the perception of public safety and the quantity and quality of law enforcement, fire protection, and rescue services

	1983	1984	1985	1986	1987	1988
Index crimes per 100,000 population	7,639	7,480	8,350	9,288	11,186	12,503
Percent who report having been victims of crime	N/A	26%	23%	24%	30%	27%
Percent who report feeling safe walking at night	N/A	64%	51%	49%	48%	49%
Average rescue call response time	5.2 min	5.3 min	5.5 min	5.4 min	5.4 min	6.6 min
Average fire call response time	4.4 min	4.6 min	4.8 min	4.4 min	5.2 min	4.8 min
Average Priority One police call response time	5.6 min	5.6 min	6.3 min	7.3 min.	8.4 min	8.6 min.
Motor vehicle accidents per 1,000 population	N/A	19.8	21.0	20.6	21.3	22.0
*Fire and rescue operating expenses per capita	$53.88	$52.97	$62.43	$64.62	$67.91	$65.04
*Law enforcement operating expenses per capita	$123.40	$127.28	$129.86	$131.59	$129.68	$130.20
Drug offense convictions	N/A	N/A	609	709	1,185	2,688

HEALTH

refers to the physical and mental health of residents and the local system of health care.

	1983	1984	1985	1986	1987	1988
Age adjusted death rate per 100,000 population	653.9	648.1	632.8	604.3	599.1	603.5
Infant mortality rate per 1,000 live births	12.5	11.3	14.2	13.6	12.2	11.4
Deaths due to heart disease per 100,000 population	299.7	293.0	266.4	279.4	273.0	255.5
Deaths due to lung cancer per 100,000 population	65.1	62.3	65.1	65.2	62.2	N/A
Suicides per 100,000 population	14.8	15.1	15.0	11.4	14.5	14.5
Deaths due to liver cirrhosis per 100,000 population	20.7	16.3	20.1	17.4	13.8	12.3
Packs of cigarettes sold per capita	131	127	128	123	120	119
Percent who report exercising at least 3 times/week	N/A	51%	51%	56%	51%	53%
Percent who rate health care system good/excellent	N/A	78%	70%	72%	74%	67%
Percent who rate their own health good/excellent	N/A	88%	82%	78%	81%	80%

EDUCATION

includes the system of public education (kindergarten through 12th grade, higher education, including adult education, and the overall literacy and educational attainment of the population

	1983	1984	1985	1986	1987	1988
Stanford Achievement Test Percentile Scores	54.58	56.46	58.20	59.06	59.28	60.34
Public school student dropout rate	3.75%	4.66%	4.30%	4.68%	4.79%	5.98%
*Public school educational expenses per student	$3,007	$3,111	$3,196	$3,115	$3,409	$3,454
*Average public school teacher salaries	$21,555	$21,761	$22,627	$23,523	$24,701	$24,269
Percent of teachers holding advanced degrees	38%	41%	40%	39%	38%	38%
Percent of faculty holding terminal degrees	72%	74%	75%	74%	72%	77%
*Average public higher education faculty salaries	$30,852	$31,467	$32,442	$32,973	$32,949	$34,491
Student enrollment in higher education institutions	87,649	82,307	77,719	85,748	88,677	89,722
Higher education degrees awarded	3,142	3,223	3,068	2,915	2,783	2,883
Percent who report being high school grad. or above	N/A	92%	84%	84%	87%	86%
Percent who report being college grad. or above	N/A	26%	25%	25%	29%	24%

THE NATURAL ENVIRONMENT

includes the natural elements of the earth's ecosystem, the quality and quantity of water, air, green space, and landscaping, and visual aesthetics

	1983	1984	1985	1986	1987	1988
Days when the Air Quality Index is in Good range	289	274	287	276	236	265
River compliance with water quality standards	94.1%	92.5%	80.1%	76.1%	67.3%	79.2%
Stream compliance with dissolved oxygen standards	72.4%	68.0%	70.3%	62.7%	72.7%	69.4%
New septic tank permits issued	1,601	1,745	2,909	3,228	2,450	1,977
Sign permits issued	2,080	2,045	2,379	1,978	1,650	4,316
Environmental public employees/100,000 population	7.2	7.9	8.7	8.2	9.9	13.0
Tons per capita of solid waste	N/A	N/A	1.34	1.47	1.59	1.48

MOBILITY

refers to opportunities for people to travel freely within Jacksonville and between Jacksonville and other locations

	1983	1984	1985	1986	1987	1988
Total weekday commercial flights in and out of JIA	160	140	143	171	169	170
Destinations served by direct flights to and from JIA	43	49	43	55	61	60
Average weekday ridership on JTA buses	36,682	35,996	31,964	29,821	30,236	28,030
Average weekday miles of JTA bus service	19,084	19,862	21,498	21,680	18,788	18,956
Average commuting time along J. Turner Butler/I 95	N/A	27 min	31 min	31 min	29 min	31 min
Average commuting time along Atlantic Boulevard	N/A	26 min	27 min	24 min	28 min	26 min
Average commuting time along San Jose Boulevard	N/A	32 min	34 min	27 min	28 min	30 min
Average commuting time along Roosevelt Boulevard	N/A	24 min	19 min	18 min	18 min	19 min
Average commuting time along I 95 North	N/A	11 min	10 min	7 min	6 min	6 min

Exhibit 2-15 (Sheet 2 of 2)

Quality Indicators, continued

GOVERNMENT/POLITICS

includes an informed and active citizenry, professionalism, and performance of local government.

	1983	1984	1985	1986	1987	1988
Percent of population 18+ registered to vote	64.3%	72.8%	60.6%	61.5%	61.9%	65.4%
Percent of registered voters who vote	28.0%	67.7%	N/A	55.4%	41.5%	66.7%
Percent of households purchasing Sunday paper	63.7%	64.4%	60.2%	62.2%	60.2%	56.4%
Percent who can name two City Council members	N/A	32%	43%	37%	45%	42%
City capital outlay expenditures per capita	$26.61	$45.45	$55.59	$77.25	$45.54	$44.34
City general governmental revenues per capita	$537.71	$585.41	$593.95	$608.77	$636.33	$649.73
Percent of City Council members who are black	16%	16%	16%	16%	16%	16%
Percent of City Council members who are female	11%	11%	16%	21%	32%	32%
Percent who rate local govt. leadership good/excellent	N/A	50%	42%	45%	47%	49%
Average days from arrest to disposition of criminal cases	65	68	57	58	38	34

THE SOCIAL ENVIRONMENT

encompasses collective or group concerns such as equality of opportunity, racial harmony, family life, human services, philanthropy, and volunteerism.

	1983	1984	1985	1986	1987	1988
Child abuse/neglect reports/1,000 children under 16	30.1	26.8	42.7	87.1	37.5	34.1
Employment discrimination complaints filed with JEOC	1,346	1,068	966	564	690	559
Percent of whites who report racism is a problem	N/A	24%	32%	33%	31%	43%
Percent of nonwhites who report racism is a problem	N/A	46%	40%	44%	54%	57%
*City human services expenditures per capita	$72.61	$76.95	$75.30	$70.66	$70.26	$54.76
*Contributions per capita to United Way & agencies	$15.57	$15.81	$19.78	$18.69	$21.75	$22.31
Percent who report having volunteered in past year	N/A	64%	55%	45%	55%	55%
Licensed day-care spaces per 1,000 children under 5	520	482	425	497	499	520

CULTURE/RECREATION

includes the available supply and use of sports and entertainment events, the performing and visual arts, public recreation, and leisure activities

	1983	1984	1985	1986	1987	1988
*Expenditures of major arts organizations	$3,523,122	$4,017,697	$4,178,574	$5,320,306	$7,463,000	$5,256,159
Park acreage per 1,000 population	5.35	5.19	5.10	4.92	5.31	5.21
*City parks and recreation expenditures per capita	$12.70	$14.68	$15.62	$15.93	$16.09	$16.69
City public recreation facilities/100,000 population	62	60	62	61	71	70
Public library materials per capita	2.33	2.31	2.36	2.44	2.52	2.66
Public library book circulation per capita	3.26	3.18	3.04	3.06	3.14	3.05
Total days of bookings at major City facilities	636	816	782	820	1,903	1,904
Zoo attendance per 1,000 population	438	464	460	518	487	513

Life in Jacksonville: Quality Indicators for Progress 1988

Fifth annual report published

The Jacksonville Community Council, Inc. (JCCI) has published its annual quality of life report, "Life in Jacksonville: Quality Indicators for Progress," that monitors 79 indicators. The report, the only one if its kind in the country, notes positive trends while recognizing negative indicators so that action can be taken to reverse the problems. The report's data is reprinted on the following pages.

The study, published under contract to the Jacksonville Chamber of Commerce, analyzes data in nine categories, tracking quality of life indicators between 1983 and 1988.

Sawyer

This year's Quality of Life Committee Chairman and Chamber Chairman elect J. Charles Sawyer, says the study indicates that the Jacksonville economy remains strong. "Indicators such as low unemployment rates and an overall increase in effective buying income show a strong, stable economy for Jacksonville," Sawyer said. "Also important are the other categories that complete Jacksonville's livability profile including crime, education and solid waste management, issues that the Chamber continues to address in order to improve the quality of life in Jacksonville."

JCCI President Charles P. Hayes Jr., M.D., president of Riverside Hospital, says the report shows that "while favorable in a wide perspective, each year the study directs community leadership to areas where there are serious concerns. Consistent analysis of these areas help to focus on long term solutions and generate a broad base of support for solving community problems."

Report shows emerging trends

The local economic indicators show a healthy economy. Unemployment rates remain low, while effective buying income per capita has increased. There is a steady constant dollar decline in the cost of electricity, and the average cost of homes and total taxable real estate values are increasing.

A new indicator in this year's report, drug offense convictions, shows a substantial increase since 1985 when information was first available. Health indicators show some positive trends. Death from heart disease, lung cancer, liver disease and suicide have declined slightly or have remained steady, and more than half the population reports exercising three times a week.

Education indicators show scores on Stanford Achievement Tests have risen slightly but the student dropout rate has also increased. Air and water quality indicators improved slightly in 1988 following steady decline, and per capita volume of solid waste deposited in landfill decreased slightly in 1988, perhaps reflecting new recycling efforts.

Measures of mobility for air travelers and automobile commuters have improved or remained steady but have declined for bus riders. Most indicators of culture and recreation have improved during the six-year testing period. Event bookings at major city facilities have increased greatly, primarily because of the opening of new facilities.

Who gathered the data

The report's data is compiled by JCCI staff members. AT&T American Transtech conducts an annual telephone survey for 11 of the indicators. The Quality of Life Committee reviews the data and makes suggestions for accuracy and improvement. The Quality of Life Committee members are Chairman **J. Charles Sawyer**, Sawyer Gas and Appliance; **Joan Carver**, Jacksonville University; **Jack Diamond**, KBJ Architects; **Patrick McCormack**, City of Jacksonville, **Carol Miner**, Florida Community College at Jacksonville; **Pam Paul**, Jacksonville Chamber of Commerce, and **Anna Scheu**, Jacksonville Chamber of Commerce.

How to receive a copy of the report

Copies of the executive summary of the report which features a more detailed analysis of the study and graphs of each indicator, are available from the Chamber or from JCCI. Additional copies of this insert are also available. Contact Anna Scheu at the Chamber for more information, 366-6650

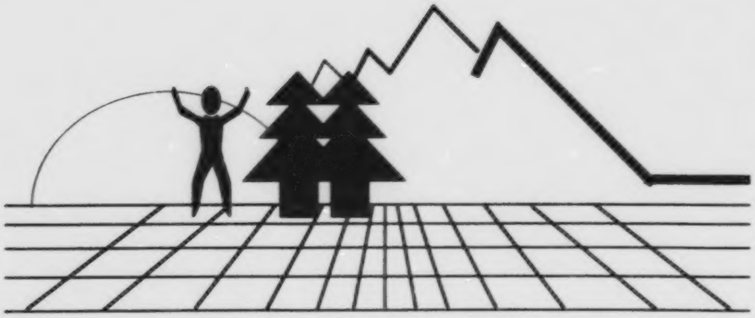
Exhibit 2-15 (Sheet 2 of 2)

THIRD ANNUAL

ELECTRIC ENERGY

FORUM

Lifestyles, the Environment and Electricity Use



**LIFESTYLES
AND
ELECTRICITY
USE**

Welcome and Introduction of Larry Bell

Chris Boatman
Conference Chairman
B.C. Hydro

Welcome and Introduction of Larry Bell by Chris Boatman

Good morning everyone. I'm Chris Boatman, your Conference Chairman. I'd like to welcome you all to the Monday session of the Third Annual Electric Energy Forum.

I'd now like to open the formal proceedings and to do that we'll begin with opening remarks by our Chairman and C.E.O., Mr. Larry Bell. Prior to his appointment to B.C. Hydro in June 1987, he spent three years as C.E.O, of Vancouver City Savings Credit Union. In addition, he has served as provincial Deputy Minister of Finance, Deputy Minister of Lands, Parks & Housing, and also as Deputy Minister Responsible for Transit. He holds a Bachelor's degree in Economics and Geography from the University of British Columbia and a Master's degree in Social Science from San Jose State College, California. He is a member of Montreal's Institute of Research on Public Policy, Chairman and C.E.O. of the Vancouver Board and Trade, a member of the Canadian National Committee for the World Energy Conference and was General Campaign Chairman for the Lower Mainland United Way Program in 1989.

It is a great pleasure to introduce Mr. Bell, who will give our opening introductory remarks.

Opening Remarks

Larry Bell
Chairman and Chief Executive Officer
B.C. Hydro

Opening Remarks by Chairman of B.C. Hydro, Larry Bell

Thank you very much Chris. And a special welcome for those of you who were not able to attend last evening, and a special thanks from me to those distinguished speakers who have agreed to come from afar and interrupt very busy schedules to be with us over these two days in Prince George. What we attempt to do with this Forum is provide a wide diversity of viewpoints with the expectation that we would be challenged. If last night is any example, we certainly will be. I'd like to recognize again the two co-sponsors, the Ministry of Environment and the Ministry of Energy, Mines and Petroleum Resources.

Your Forum package contains a report entitled "An Introduction to the 1990 Electricity Plan". It includes a review of B.C. Hydro's latest projections of future demand and a description of the choices that can be made in meeting this demand. It's a summary document but the full document is also available for anybody who wishes it. I'd urge you to spend some time reading it.

This Annual Forum is an opportunity that we create during the year to discuss contemporary policy issues that have an impact on the supply and demand for electricity. The theme in this particular Forum, "Lifestyles, the Environment and Electricity Use", of course, is to discuss the linkages between lifestyles or economic base and electricity use. Further, we want to continue to increase awareness of the environmental implications of our society's demand for electricity. Now some of you will have attended our First Annual Electric Forum dealt with our proposals for demand-side management, ultimately called Power Smart, and purchasers of electric energy from independent power producers.

Last year we focused on "Energy and the Environment" and we attempted to get as much discussion between people with a variety of viewpoints as we possibly could. Some of you who were there will remember that we had about five hours of roundtable workshops. Out of those came three themes that can be readily identified. First of all, of course, was the importance of conservation. Secondly, was the need to improve communication and I would observe that to be a good communicator you need to be a good listener as well as a contributor. We see this communication with the various publics as a partnership. There is an obligation in terms of performance, focus and dedication on both parties. And thirdly, was a topic that Dr. Henderson covered very ably last night and that was "how do we recognize this change in society's values, those things that we haven't monetized. How do we put that into the formula when we are driven by least-cost resource planning?" Now with respect to that latter, and building again on the comments of last night, that it's not up to a utility to make these kinds of judgements. Historically, we internalized some of those judgements as assumptions. The degree to which we can, we will avoid that in future. We won't avoid it completely, but what we want to do is to put questions in simple and straightforward terms to the government and to our democratic institutions.

Now part of that discussion about values attempted to evaluate various alternate resources that are available, alternate being non-traditional in the context of British Columbia. You will see in the Electricity Plan we have rated these various resources on a number of scales, as well as indicating our best guess as to their costs might be in terms of scaling them up for practical use by a utility. We invite you to score that table yourselves. In fact, I believe there will be a questionnaire distributed which will provide you with the format to do that. We are very interested in seeing the diversity of views and in establishing those points on which we have a consensus.

In that third area of values, a great deal of discussion focused on the value of the environment and what initiatives we should take. I am a great believer in discussing these issues but, I also believe that you said, "Then get on with it."

As a corporation we have focused on recycling waste paper. Earlier, I mentioned the number of tons of waste paper per month we now recycle in our head office, which is an embarrassment to me. We also have put together a strategy for our gas-fired Burrard Thermal Plant. There are federal regulatory limits for that plant. Let's just use a unit emission concentration of 200 parts per million. We agreed with the GVRD to a limit of roughly half of that and have taken initiatives to take the emissions from one of our turbines on an experimental basis down to 50 parts per million. We are looking at technology today that, over the next ten years, can take the emissions down to about ten parts per million. This shows you the kind of achievement that can be realized with today's technology. It's not without a cost and it's not without some technical challenges. We have committed that the Burrard Plant will be one of the cleanest plants in North America.

We also recognized that while we are a small contributor of emissions in Greater Vancouver, in the larger scale of things, in the Lower Mainland, we are also one that can control our emissions. And so we have adopted a voluntary practice of shutting down our Burrard plant whenever the air standards exceed a certain threshold. Last summer we voluntarily shut down the plant several times due to weather forecasts well before those thresholds were reached.

We have looked at where the greatest gains for air quality in the Lower Mainland. That's with the cars obviously, as they are the source of 80 percent of the emissions. While we have a modest fleet of vehicles, we have set standards for our fleet. We will see a 50 percent decline in emissions from our cars over the next five years in the Lower Mainland. Now, interestingly enough, some of that is just buying new cars, some of that is tuning up our existing cars, and so on. Nothing very sophisticated, but it really is applying the first principle that you care. We used to have a policy in our fleet management. We were concerned about our people being out in tough weather conditions in the winter with a car that's four or five years old. So what we would do is bring these older cards down to Vancouver from the north when they probably emitted about twice the exhaust emissions that they did when they were new. In the context of the air quality challenge in Vancouver it was not a sensible thing to do.

We are also focusing on the natural resources we use and how we can proceed toward their multiple use.

Zig Hathorn will be talking a lot more about the details of our other environmental initiatives in that regard. But the focus was on doing something ourselves by going through the corporation with our employees. I can tell you that the "Valdez Principles" are something that I just read yesterday and they sound familiar to me. I don't think there's one of those principles that we wouldn't embrace in B.C. Hydro. Now of course it's all a matter of degree and interpretation but the thrust behind those principles are consistent with our view of our responsibility.

I would like to comment on four of the programmatic initiatives that we have taken as a result of our planning and the discussions that we've had at Forums and in other similar meetings with the public. First of all, we have Power Smart - our conservation program. I am delighted to report that the Inn of the North is Power Smart. They have just replaced their hallway lights with compact fluorescents. Of course the beauty of all of this is that everybody wins when we can persuade people to take the time, we meet with great success. This hotel will save something like $18,000 a year on their electricity bill as a result of the initiatives they have taken over the last few weeks.

We estimate that in the first year of the program, we have changed practices to the degree that we have achieved savings equivalent to the energy used by 5,000 homes. I did a rough calculation. Those who do the more refined calculations, like Ken Peterson, shudder when I do these things. It looked like we spent, including startup, about $20 to $25 million to realize that energy reduction. A traditional hydro project that would cost us roughly double that for the same amount of energy. We think in the long run that our conservation programs, as they are in place today, will be even cheaper. We think that the five or six percent energy savings that we have in our Plan today is a very modest start and there is much more that can be saved. Quite frankly we find it's difficult to get people to change. The impediments are institutional impediments. It's not the technology. It's not our willingness to go out and sell things. It's not our budget. It's the difficulty of getting to get people to accept change and to be willing to cope with a very dynamic environment.

We have adopted the philosophy in conservation that we want to set up programs that have a life cycle of about six or seven months. Then they're reconstituted and move on to even higher goals. With respect to lighting and, in other such programs, we have achieved this. It was less than a year ago when I got a very nasty letter from the Canadian Manufacturers Association. They told me that it was totally impossible to produce energy-efficient refrigerators in Canada and what was I doing creating all these problems. Of course, what we did was give $50 rebates to consumers but there was no product. It's just wonderful how the marketplace works. Two months later, one of the major manufacturers saw the rebate as an opportunity and manufactured a line of energy-efficient fridges for B.C. only. Just recently Sears Canada has announced that they will not stock any fridges unless they are energy-efficient, and able to meet our standards of Power Smart. That's the kind of change that takes place over just a period of months. So now what we are going to do is "up" the threshold and go about it again. And I will probably get another nasty letter.

Well a lot of exciting things that are happening. We are just delighted that we are getting municipalities to agree to a standard set of conservation principles. We've now got the provincial government purchasing only energy-efficient appliances, and on it goes. It's a great program and one that we are very proud of. We may even take it nationally. There's been an expression of interest from the other utilities across Canada. What we are doing is taking national initiatives that make sense. Another example, before I move on to Resource Smart, is the adoption of 34-watt energy-efficient fluorescent tubes, not 40 watt but 34. The savings is just a little better than that ratio of 34:40. We now have all three manufacturers in Canada putting our Power Smart logo on all the 34's. They have agreed only to ship 34-watt bulbs to British Columbia. Those are the kinds of changes that we try. Then we let the marketplace take advantage of these opportunities through our prodding and through our partnership with them. I can say that once they get over the chagrin that they are very cooperative with us.

Let me move onto Resource Smart. We recognize the need to ensure that our existing plant is as efficient as possible. We have dams without generators, we have older plants with turbines that can be made more efficient, and all the way down to very small incremental changes that can be made in terms of reducing penstock leakage. Thirty-year old equipment that can be brought to-to-date. We have mandated within our organization that all of these improvements will be pursued just as vigorously as Power Smart. This is our first, best choice for new energy. Along with conservation and there is no constraint on this Resource Smart activity. I am delighted to say it took only about three or four months for our engineers to put together a very impressive program. They continue to find ways in which we can be more efficient with our existing plant. I heard a proposal the other day. When I heard it, I thought we were really getting down to it. We have a penstock in one particular generating plant that's about 30 years old, and obviously it's got scale and some rust inside it. We determined that if we take the opportunity to shut that plant down, scale the inside of that penstock and paint it, that the friction loss would be reduced. I think we get the extra energy for about half a cent per kilowatt-hour. In a new plant, traditional hydro costs about five cents per kilowatt-hour.

With respect to Independent Power Producers, their response has been well beyond our expectations. We are delighted to see this industry develop in British Columbia. We are delighted to have our major customers have an alternative source. It breaks the generation monopoly down. Indeed, we want to inject competition. We have already signed two major contracts and a number of minor ones (under 5 MW) for small hydro projects, and more are under discussion. We were all in a learning curve in the first competition for 150 MW. We thought we would have a meeting with those who are interested in developing this industry to see whether we could improve the process. We thought about 50 people would show up. We moved the venue three times and ended up with 400 people. There is absolutely no question that where you put an opportunity forward which has a sound business case the marketplace will respond. In fact, I worry a little bit about being able to handle the amount of energy that is being proposed.

I can tell you that in this province that we have an environmental challenge with respect to wood waste. The operation that is going into Williams Lake is really a win for the community because it had a very undesirable air quality problem, the mills had a disposal problem and we would like to buy electricity. Put all of that together, and we ended up with what I think to be a first-rate new generating resource for British Columbia. Well, there are probably eight or ten other opportunities like that. There are certainly eight or ten that people are working on. We are now participating on a committee that is examining the potential shortage of wood waste in the nineties in this province. I take that as a compliment.

Well, those are just some of the initiatives that we have taken over the last couple of years and we hope that there will be other ideas and other concepts that come forward. We know there will be some ideas generated from this Forum. We look to move on and take some action with respect to them.

Just before I offer some concluding comments, I would like to just make a few observations with respect to demand. I see in my speaking notes the word "need".

And "need" has some sort of connotation of values. I am not sure we are equipped to judge "need". We certainly know lots about demand, and we know about the obligation to serve. I was out early this morning in our line room as we were dispatching our repair crews. There were some pretty tired people there and, I'm proud to say, our first apprentice female line person. They were coming off 18-hour shifts trying to put electricity network back together after the windstorm on Saturday. So the question of demand is an abstraction when we discuss it here. When your lights don't come on in your house it's no longer an abstraction. There were 15,000 people whose electricity was interrupted. We only have about 1,000 left without power, in the outlying areas. This involved marshalling resources from all over this province. We flew crews in from the Peace River, from Vancouver, and called on contractors from the Cariboo to put the system back into service. The point I am making is that when we don't have electricity we begin to see the value of it and how it is an integral part of our life. So we have to be a little careful in talking about need and demand, and the risk associated with not serving that demand. As a public utility we have an obligation to serve, that is, we accept the obligation for anybody who asks for energy within our service area. That is an automatic obligation on our part to serve them.

I was delighted last night to meet somebody who is attending our Forum and who doesn't use any electrical energy at all. This particular individual, Dan Pakala, lives near Telegraph Creek. This is the fellow that can really talk to you about us reducing electricity consumption in this province. Here's a fellow that I think has some experience and some expertise. I hope you contribute that during the discussion groups Dan. There's not many like you. You are a pretty rare person.

Our population has increased over the last decade by about 18 percent and that continues to drive up the demand for electricity in this province.

Demographers look at Canada and say without immigration, we are going to have a contracting population. That's very true. So there's a real societal choice involved in all of this. I believe that British Columbia is still the most attractive place to live in Canada. The greatest number of immigrants to this province are from other places in Canada and not international immigration. We have examples of societies like Singapore and Hong Kong who are very nervous. They won't publish their emigration statistics. These statistics are confidential in Singapore because they are concerned about the labour shortage and a low birth rate. They are very concerned in terms of the continuing prosperity of their city state. There are examples where concern is a declining population, not a growing population.

Well, economic growth over the last decade was 30 percent in British Columbia, and the ratio between the growth in electrical energy demand and the gross product has remained constant over the last 20 to 30 years. The growth in electricity demand exceeds economic growth by a factor of about 20 to 30 percent and that ratio remains. Now part of that growth in electric demand is a shift away from other sources of energy. We've got to remember that in terms of lifestyles. But the result is that the electrical energy used in British Columbia over the last decade went up over 40 percent. And that was during the 1980s when we had a very significant recession. So we can see that our forecast of 2.7 percent per year out over the next 20 years is modest indeed.

In fact, I will make three observations. First of all, there is a tendency, which will increase, to become more and more concerned about the environment and we push the environmental issues upstream. Upstream means we use electricity rather than a primary source of energy and deal with the associated and environmental impacts that flow from that at the source.

A very interesting example of this is the thermo-mechanical pulping process. Shifting away from the traditional methods, with their related environmental impacts, thermo-mechanical pulping results in a 50 to 100 percent increase in the amount of electrical energy per ton of pulp. So nothing is free. We have a series of trade-offs and we just have to make them in a very conscious manner.

Another observation about electrical cars; you are invited to take a ride in the two demonstration cars we have brought to the Forum. I certainly am going to. A lot of you have heard about Los Angeles, where they are adopting electric cars wholesale. I wonder where the electricity is coming from that is going to charge all those batteries. I think there is no question that a large plant, such as we have in Vancouver could produce the electricity. But you need to invest the capital, and have professionals who monitor the emissions. That's an easier place to control the emissions of all those vehicle.

Well, the last observation I leave with you is that we in Canada have a very energy-intensive economy. We are ranked right up there with Norway. I think we are the highest in the world in terms of consumption of electrical energy per capita. But to some extent, that reflects our industrial base. What we want to examine further is whether we are being as efficient as possible per ton of pulp, one of our major products. Beyond that, we have analyzed the changes in consumption of our non-electric heating customers over the years. It has remained stable and in spite of the Power Smart and the increase in energy and efficiency of our utilities. In fact, we use about 9400 kW·h annually per household in B.C. This is double the consumption per household compared to Japan, Great Britain, France and Germany. So we have to stop and think a little bit about our lifestyles and how we manage our affairs as consumers of energy.

In the "Introduction to the 1990 Electricity Plan" (in your registrants package) we have identified what we see as some of the electrical energy issues for the 1990s. These are really intended to be thought starters, to provoke discussion, to invite you to think a little bit. I will just run quickly over these topics. It's my guess that these topics will be with us during the decade of the 1990s.

The first area is pricing and supply in the 1990s. Do we still have the postage stamp rate? Do we have a rate restructuring where the more you consume the more you pay? A whole variety of issues there that need to be resolved. Reliability and power quality. I always tell the story of a manufacturer who located on cheap land at the end of a radial line, that is, electricity wasn't being fed both ways into their factory. Well guess what one of the factors that contributed to this land being cheap? It had a radial supply. Now when they bought the land it didn't occur to them to think about security of supply. And his line was particularly vulnerable. It ran past the neighbourhood pub, and people keep hitting our poles and interrupting his service. This fellow was very frustrated because he had a highly automated plant. And it's not only reliability, i.e. being cut off the power, but the quality, i.e. constant voltage and frequency and so on. We really had to spend some time and explain this to him. This is really something you have to be conscious of, particularly as we begin to run more and more electronic equipment in our homes, and in our businesses. This will be an issue for the 1990s.

The electricity trade is another very important issue. And it's one that we have not explained well. The "Westcoast Vision" is a document we put together with BPA and have shared with California and with Alberta. Really what we are saying in this document is that we have an obligation as interconnected utilities to optimize and to trade electricity. We have an enormous resource in our reservoirs because we can store energy in them. Therefore when people are generating surplus energy we can buy it from them and store it. We actually charge storage fees for this service. It's a very complex business. Electricity is not a single product and a single quality. We have to have a greater understanding of what's going on. I think that probably right now that the Columbia's in freshet and in Washington State they are flushing the migratory salmon downstream by running their plants flat out. This produces more electricity than they can use, and we traditionally buy or store the excess from BPA during this period of the year. We want you to have a broader and more general understanding of these kinds of opportunities, and why we end up trading and selling electrical energy.

Well, with these few thoughts, I again thank you very much for your participation. I'm delighted that we are here in Prince George and I'm delighted at the turn-out. I look forward to meeting all of you during the next two days. I hope you have an informative and stimulating Forum. Thank you very much.

Introduction of Dr. John Foster

Chris Boatman
Conference Chairman
B.C. Hydro

Introduction of Dr. John Foster by Chris Boatman

Thank you very much Mr. Bell for those opening remarks. I would like to move quickly now onto our first guest speaker of the morning. He is going to speak to us on "Patterns of World Energy Use". Dr. John Foster is President of the World Energy Council and a former President of Atomic Energy of Canada Ltd. Dr. Foster was a member of the group that produced the feasibility study for Canada's first nuclear power generating station and was in charge of the engineering for other CANDU nuclear powerplants in Canada and around the world. As a member of the Canadian Committee and the International Executive of the World Energy Council, Dr. Foster has studied electricity use, and electricity generation throughout the world. Dr. Foster has received a number of awards, including the Governor General's medal, the Julian C. Smith medal from the Engineering Institute of Canada, and the McNaughton Medal from the Institute of Electrical and Electronics Engineers. He also has honourary doctorates from the Technical University of Nova Scotia and Carlton University. I would like you to join me in welcoming Dr. John Foster.

Patterns of World Energy Use

Dr. John Foster
President
World Energy Council

Mr. Chairman, distinguished guests, ladies and gentlemen: It was very kind of you to invite me to speak at this, your third, Annual Electric Energy Forum. I am looking forward very much to hearing and participating in the discussions on "Lifestyles, the Environment and Electricity Use". The World Energy Council is just commencing another major study, "Energy for Tomorrow's World - the realities, the real options, and the agenda for achievement", the results of which will be presented at our next Congress in Madrid in 1992. Lifestyles, the environment and electricity use are key elements in any consideration of man's use of energy in the future.

My task at the moment, is to help to provide some background by saying a few things about existing patterns of world energy use.

In a global context the order of importance of energy sources is quite different from the order that we are used to. For half a million years or more, since the discovery of how to control fire, wood has been our most important source of energy and still is in the world as a whole, in terms of the number of people dependent upon it for vital energy needs. For 10,000 years, since the beginning of permanent settlements, this has been augmented by straw and dung and other agricultural wastes - still an extremely important energy source for more than a billion people. In contrast, it is a century now since wood was replaced by coal as the most important energy source in this country.

Because of this general and basic importance of biomass I am going to start my discussion of patterns of world energy use with it. Exhibit 3-1 shows the use of biomass in six countries which are among the biggest users, on a per capita basis, of this source of energy.

One Gigajoule is the energy in about 20 litres of gasoline so that 15 Gigajoules per year is equal to about one litre a day. Now let us see who these countries are. (See Exhibit 3-2.)

The countries are, in order from the left, Tanzania, Brazil, Canada, the United States, China and India. These aren't the six biggest users but they are certainly among the biggest. The nature of the biomass, of course, differs among the countries. Whereas in the developing countries it is largely firewood and farm wastes, in Canada and the U.S. it is largely forestry wastes; waste wood and spent liquors. Brazil is a special case. About 40 percent of its biomass is alcohol derived from sugar cane and used for automobile fuel.

The point to note is that the two industrialized countries use about as much biomass, on a per capita basis, as the developing countries and indeed more than China and India with nearly 40 percent of the world's population.

Let us now broaden the picture to include the other great renewable energy source - water power. (See Exhibit 3-3.)

This chart is dominated by our own fortunate situation. Even with our small population, Canada produces more hydroelectricity than any other country. The United States produces about 90 percent as much, Brazil about 60 percent as much and even China about a third as much but per capita availability is markedly less because of their much greater populations. However, our good fortune was not the point that I wanted to bring out with this chart. Rather it was the general point that where resources exist the industrialized countries, or an industrializing country like Brazil, are using more renewable energy per person than the developing countries.

Finally, let us look at total energy, that is the energy we derive from the renewables plus that which we get from the world's stored energy - from the fossil fuels - coal, oil and gas - and from uranium. (See Exhibit 3-4.)

The two bottom segments in each column are the biomass and hydro that we have just looked at. The three top segments in each column, best seen in the Canadian and American columns, are, from the lowest to the top, energy derived directly from fossil fuels, electricity from fossil fuels and nuclear energy. Here we see what really distinguishes the pattern of energy use in the industrialized countries from that in the developing countries - the great use of mineral energy sources. You will notice, incidentally, that Canada's abundant supply of hydroelectricity substitutes for some of the fossil fuel used in other industrialized countries, exemplified here by the United States.

We mustn't forget, of course, that only about one-quarter of the world's population are in the industrialized countries; that three-quarters live on the energy ration represented here by the data for Tanzania, Brazil, China and India. But now I should like to move on to review how we compare with other major industrialized countries. (See Exhibit 3-5.)

This chart shows the energy supply, again on a per capita basis, in 1987 for Canada, the U.S.A., the Federal Republic of Germany, Sweden, France and Japan. Germany's energy use, incidentally, is fairly typical for all that band of northern European countries from Ireland to the U.S.S.R. The various sources of this energy are indicated by the different patterned segments in each column. From the bottom up they are biomass, fossil fuels used as such, electricity produced from fossil fuels, nuclear-electricity, and hydro-electricity.

There are some interesting differences among the countries because of the differences in indigenous availability of various resources; for instance, the extraordinary importance of hydro-electricity in Canada and Sweden. In both these countries, and in France, fossil fuels are a minor source of electricity, in contrast with the situation in the U.S.A., Germany and Japan. In Sweden and France, nuclear power is a very important source of electricity, providing half of the electricity in Sweden and three-quarters in France. It is also noteworthy how much energy Sweden gets from biomass - wood wastes and peat. However, the most notable feature on this chart is the large difference between the total energy use in North America and Sweden and that in the other three countries.

Let's look into this, and particularly into the relationship between Canada and some of the other countries. (See Exhibit 3-6.)

This chart shows the application of the energy in the same six industrialized countries. It is again on a per capita basis and is given for three broad categories of use: use in industry; use in transportation; and all other uses, which include residential, commercial, agricultural, and public use.

If we start at the top - the general uses - the different levels of energy use are due to differences in climate and lifestyles. Canada has the greatest heating requirement and the U.S.A., by far the most air conditioning. With respect to lifestyles, households in all countries have a considerable array of amenities from piped water to VCR's, but there is a 50 percent spread in the size of those households - from Sweden at 2.2 persons per household to Japan with 3.3 These simple facts aren't a total explanation of the differences in energy use but they are important factors.

For transportation - the middle segment in the columns - per capita energy use in North America is about twice what it is in the other countries. The first obvious reason is that inter-urban distances are very much greater in Canada and the U.S. but, even within urban areas, energy use for transportation is greater. There is much more use of private automobiles for commuting in North America. In Canada about three-quarters of us use our cars to go to work; in the United States even more. In the other countries less than one-third do so. In the Federal Republic of Germany, for instance, in 1986 more people (37.5 percent) walked to work than went by car (32.4 percent). For one thing gasoline taxes are very much higher so that gasoline prices are about twice what they are in Canada. Then, too, public transportation systems are much more comprehensive in other parts of the world.

Finally, there is the energy use in industry. Again, there is a large difference between the use, on a per capita basis, in North America and that in Europe and Japan. There are several factors that affect this:

- Products - ranging from primary industrial to high tech products with decreasing energy content
- Market Size - efficiency advantage of larger scale operations
- Trade - energy content of products traded
- Quality - of plant and operations
- Climate

Several of these factors are such in Canada as to elevate the use of energy in industry. We have a relatively high proportion of primary industry, our domestic market is relatively small, trade is nearly 30 percent of our GDP with several commodities having high energy content (e.g. newsprint and aluminum) going out, and I needn't say anything about our climate.

Exhibit 3-7 illustrates one of these factors. It shows the percentages of GDP in the six countries that is attributable to primary industry, to manufacturing, to construction and to utilities. (Omitted are trade, finance, services and government which use relatively little energy.) As you can see, the proportion of primary energy in Canada is about twice what it is in the other countries and the proportion of manufacturing is considerably less than in Europe and Japan.

Whether the factors I have mentioned totally explain the difference in the patterns of energy use in Canada and in the other countries is difficult to say. What we can be more definite about is the comparative trends in the patterns of energy use over the past two decades.

Exhibit 3-8 shows the use of coal, oil, gas and electricity in industry per unit of GDP for the years 1970 and 1987 in Canada, the Federal Republic of Germany and Sweden. Starting with coal, at the bottom, we see each of the countries has halved its use as a result of improved efficiency and the attractiveness of alternatives such as electricity in the steel industry. Behaviour with respect to oil, however, is markedly different. Canada, which has been largely self-sufficient in oil in the eighties, has halved its use of oil in response to the price shocks of the 1970s. Germany and Sweden, without domestic resources, reacted much more strongly, reducing their use of oil by three-quarters and two-thirds, respectively. All countries continued to use the same amount of gas and electricity per unit of GDP. In fact Sweden, which uses very little gas, actually increased her specific use of electricity.

This is brought out strikingly in Exhibit 3-9, which shows electricity use in industry as a percentage of total energy use for the years 1970, 1973, 1979, 1984 and 1987. The proportion of electricity has grown in all countries as induction and microwave heating, heat pumps, better motor drives, thermo-mechanical pulping and other electro-technologies have displaced less efficient and less congenial technologies based on the direct use of coal and oil. Canada, already a relatively high user of electricity, was a little later than other countries in getting off the mark probably because of the National Energy Program which delayed Canadian response to the changes in world oil prices in the seventies. Sweden, traditionally a high user of electricity and without gas, reacted in a very pronounced way to the new price regime for imported fuels. Indigenous energy supply was doubled by a vigorous nuclear power program.

In using natural resources, or anything for that matter, to achieve a particular purpose it is impossible to focus the process exactly and only on the objective that is sought. There are always, necessarily, some extraneous effects besides those that are desired. In medicine they are called side effects. In the field of energy these unwanted side effects are in the form of waste products and the damage from processes gone awry. This has been so since the beginning of time. The first life forms, more than three billion years ago, produced wastes that if allowed to accumulate would have poisoned them and the sunlight that nurtured life in the seas killed whatever life was thrown on the shore. The adverse effects of fire were known to our ancestors long before they knew how to utilize it. We can be very sure that not long after someone announced he had figured out how to handle fire someone else said: "You're not going to bring that into this cave." Much nearer our own times a Royal proclamation prohibited the burning of coal in London in the fourteenth century. After the advent of the Industrial Revolution women complained of soot from industrial plants on the family wash. By this century, when acidic particles from powerplants began to pit the finish on their husbands' cars the situation was clearly serious. Action had to be taken and about 50 years ago the first electrostatic precipitators were installed. Then followed tall stacks to reduce ground concentrations of acidic gases. About 20 years ago the first flue gas desulphurization units were installed, lead-free gasoline was introduced and automobile emission control was instituted. More efficient automobiles were required. Legislation around the world and regional agreements have required more and more stringent pollution controls and more attention to the environment. Greater efficiency has been encouraged by governments by subsidies and other means. Electrical utilities are assisting customers to adopt more efficient methods and to moderate their need for power.

What distinguishes the present situation from what has gone before is the scale. Man's use of energy is now on such a scale that the side effects are no longer confined to the immediate neighbourhood but extend over very big areas. India has lost forests with an area as great as New Brunswick over a period of 15 years. In Africa, deforestation, mainly for fuel, is leading to desertification in some areas. In North America and Europe gaseous products of combustion have had an effect on the environment over large areas, some hydroelectric developments have pre-empted productive valleys and flooded large extents of wildlife habitat, a nuclear accident - that at Chernobyl in the U.S.S.R. - adversely affected a large expanse of farmland and spread low-level activity over half of Europe. There is now even concern in some quarters that the present patterns of energy use can cause changes in the environment on a global scale.

The use of energy on this scale, however, has within it the seeds of remedy for these ills. It is part of the technological fabric that makes possible the physically easy and intellectually productive life we enjoy these days. This provides us with the knowledge and the wealth that will, in time, permit us to enjoy the benefits of ample energy while maintaining a healthy environment. We have the basic knowledge now to burn the fossil fuels more cleanly. Nuclear energy, even taking Chernobyl into account, has proven remarkably safe. We can imagine a time when it with electricity and hydrogen can provide all the energy needed in a way that is compatible with a wholesome environment. Even though we have the necessary technologies now, such a state is almost certainly a few centuries away. There are more economic systems available. There are still many attractive hydroelectric developments and the fossil fuels have a lot of mileage in them yet. Although we may use most of the obtainable gas and conventional oil by the middle of the next century there are still the tar sands and oil shales and enough coal to support present levels of consumption for two or three centuries. Even if we wanted to change to some alternative energy system that we might regard as the desirable ultimate system and were prepared to assume the higher costs, decades would be required for the necessary learning and for the change in capital stock, not to mention the changes in attitudes and even cultures that would be involved. No, it is going to be a long gradual process.

The adaption of energy systems, particularly in advanced countries, to preserve a good environment will be one of the main features of the patterns of energy use from now on. The other main feature must be the extension of adequate energy systems to all parts of the world. Thank you.

References:
1) World Energy Council - National Energy Data, 1989
2) Britannica World Data - Book of the Year, 1990

Thanks to Dr. John Foster by Chris Boatman

I would like to thank Dr. Foster for a very entertaining opening presentation on "Patterns of World Energy Use". He's helped put the problem in perspective for us and hopefully that will encourage some lively debate when he rejoins us later after the break for the panel discussion.

Exhibit 3 - 1

BIOMASS ENERGY CONSUMPTION
GIGAJOULES PER CAPITA 1987

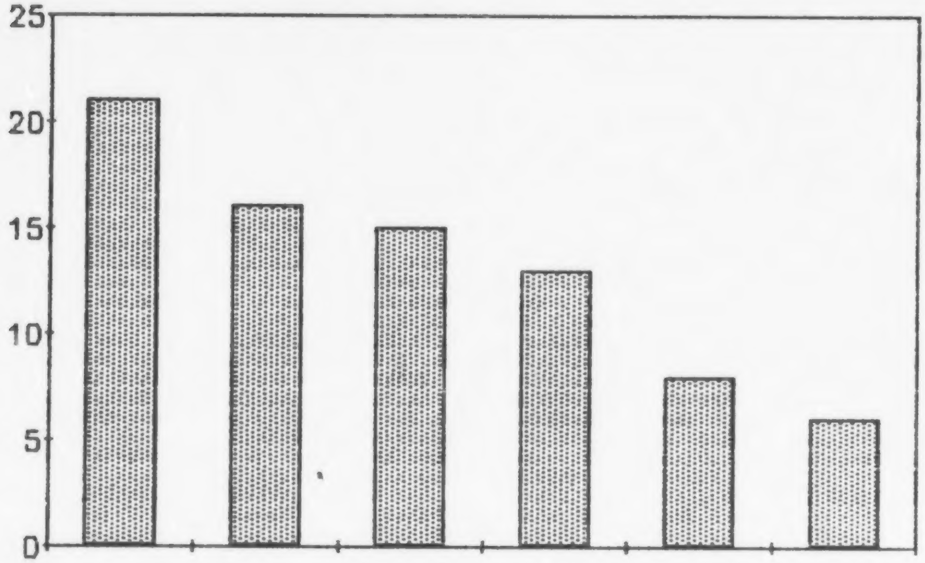


Exhibit 3 - 2

BIOMASS ENERGY CONSUMPTION
GIGAJOULES PER CAPITA PER YEAR 1987

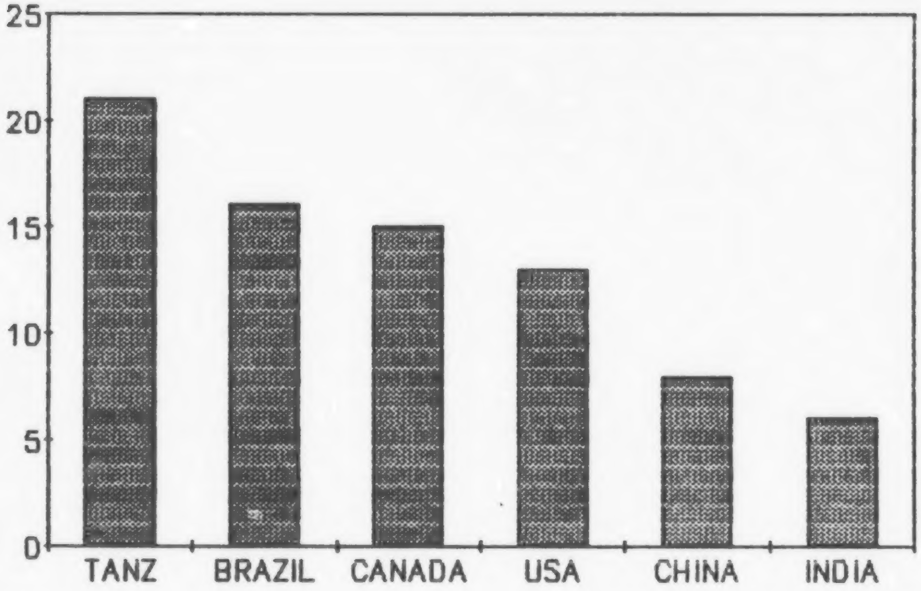


Exhibit 3 - 3

"RENEWABLES" ENERGY CONSUMPTION
GIGAJOULES PER CAPITA PER YR. (1987)

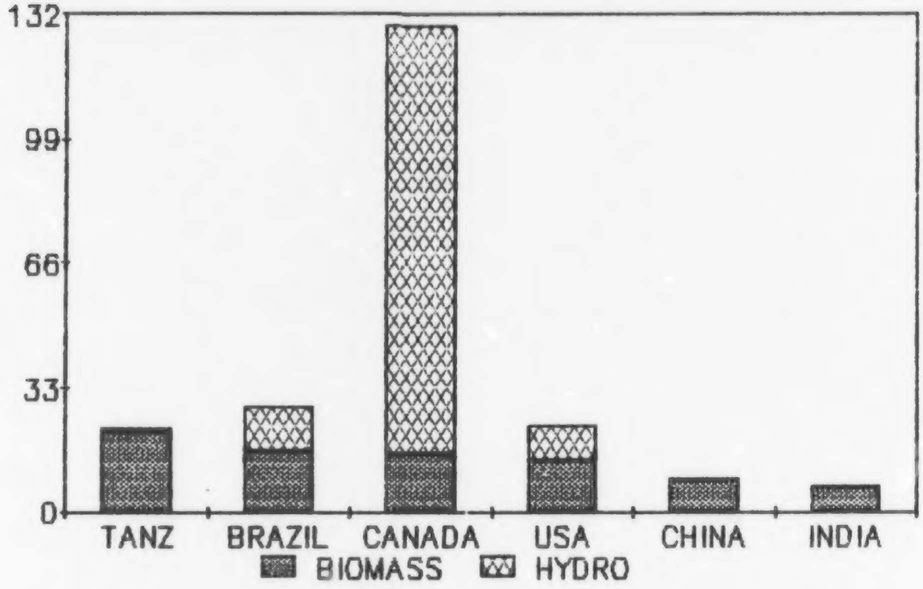


Exhibit 3 - 4

ENERGY SUPPLY (GJ/cap) 1987

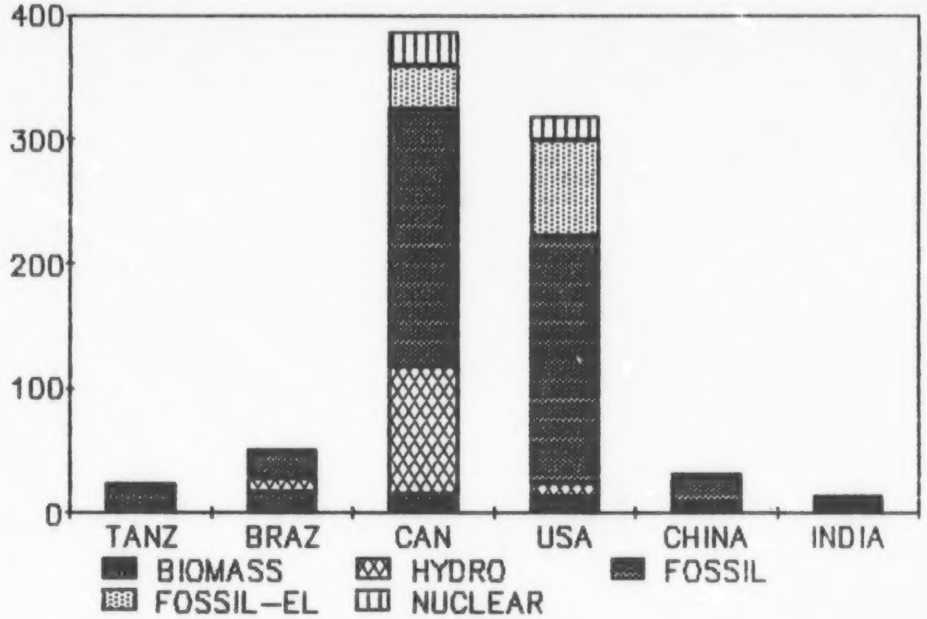


Exhibit 3 - 5

THE INDUSTRIALIZED COUNTRIES

ENERGY SUPPLY (GJ/c) 1987

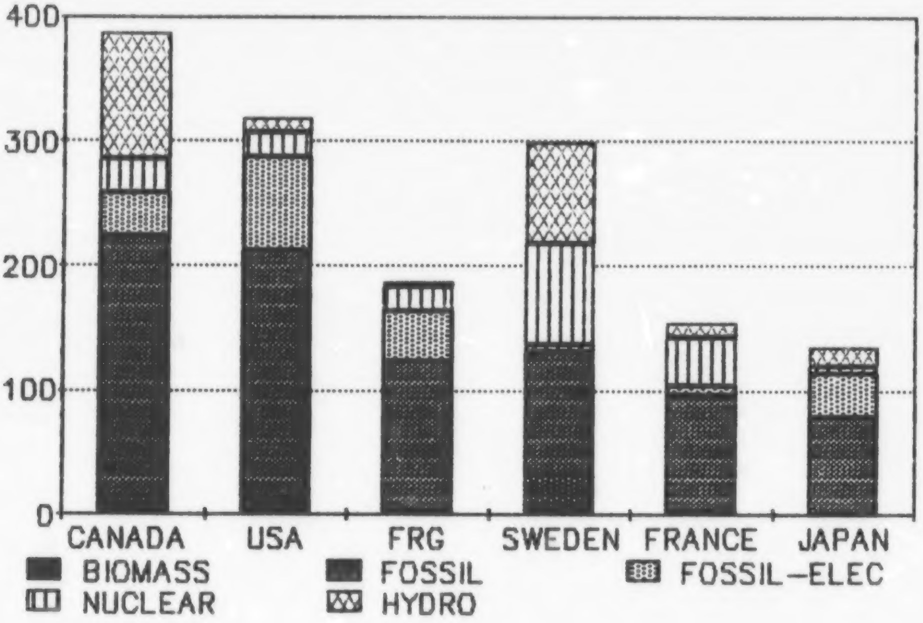


Exhibit 3 - 6

ENERGY APPLICATION
GIGAJOULES PER CAPITA 1987

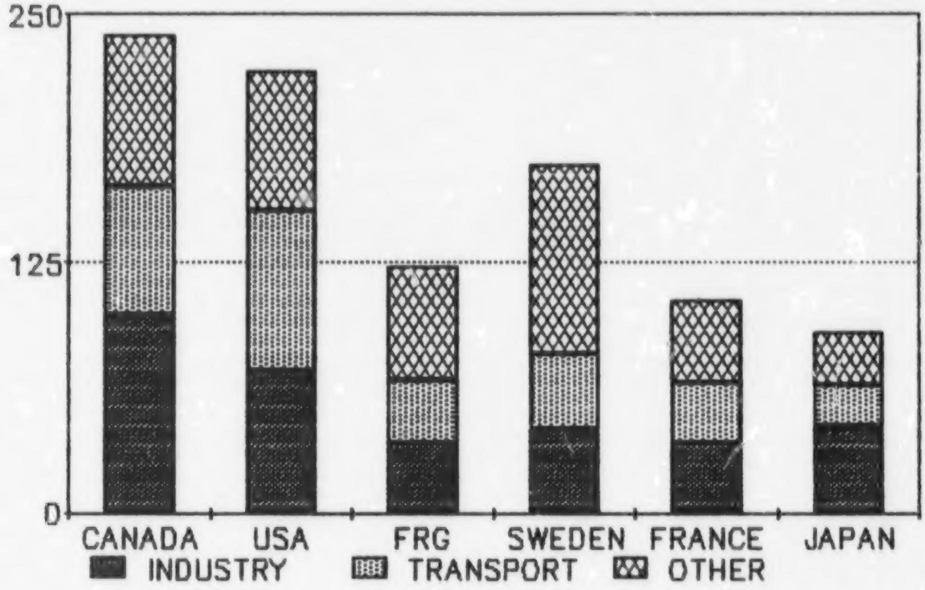


Exhibit 3 - 7

COMPOSITION OF GDP (PERCENT) 1987

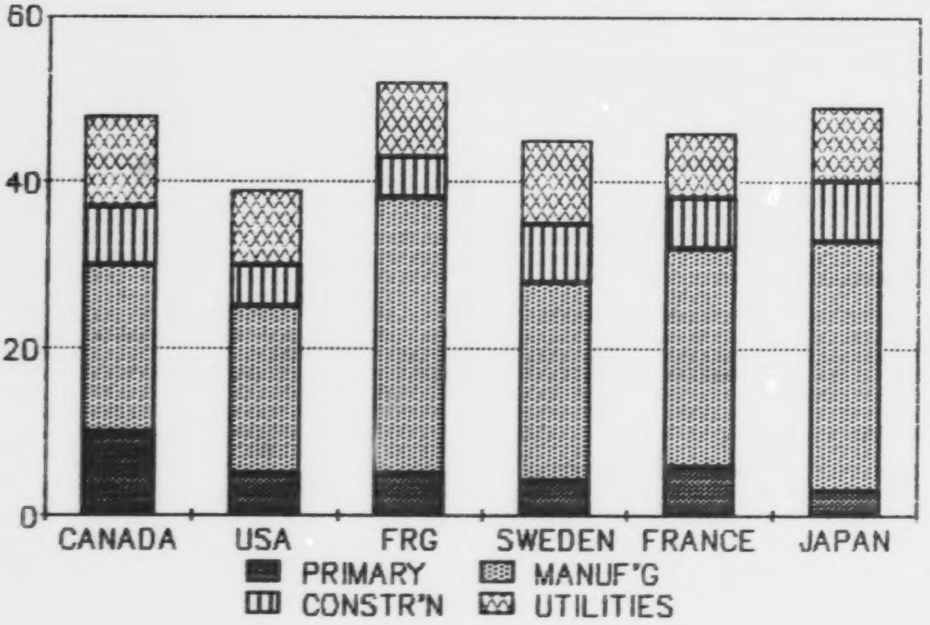


Exhibit 3 - 8

ENERGY CONSUMPTION IN INDUSTRY
MEGAJOULES PER DOLLAR (US80) GDP

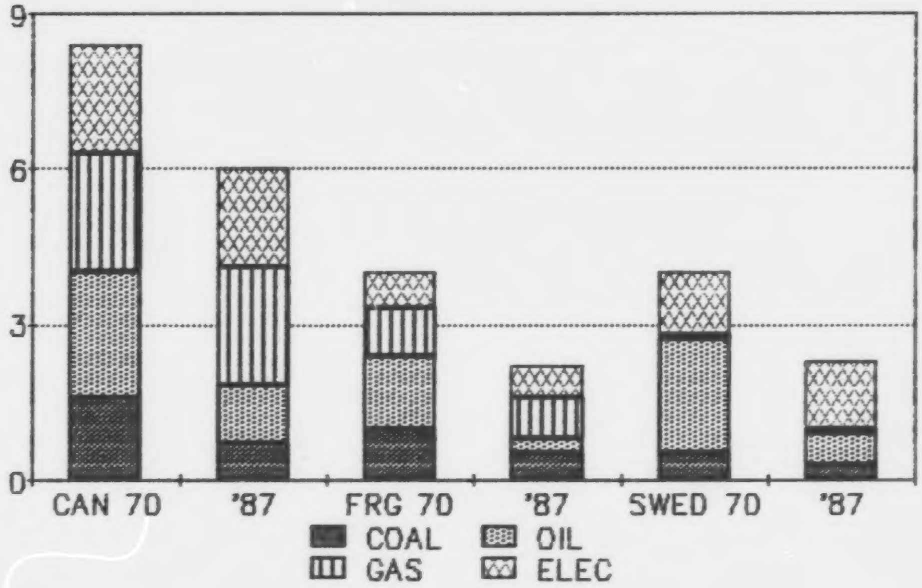
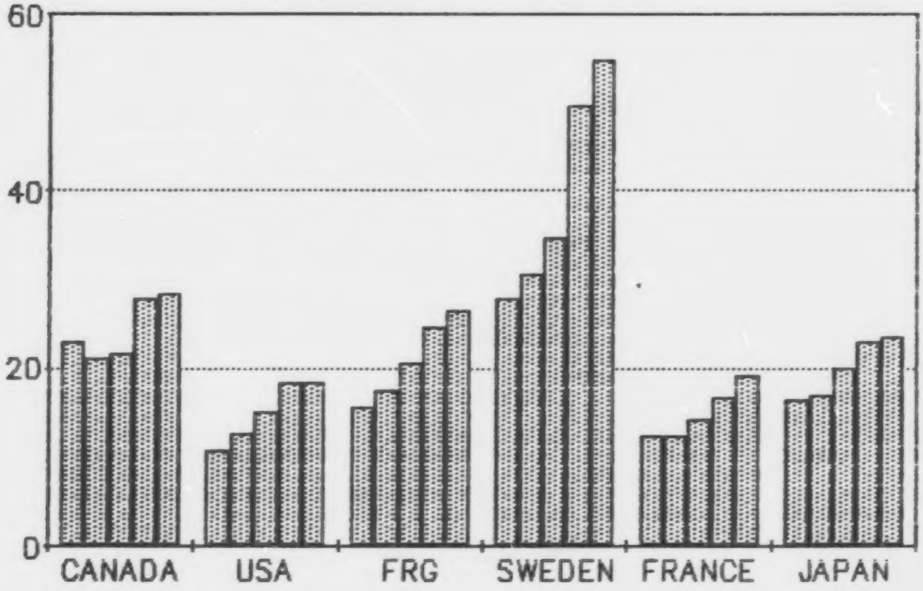


Exhibit 3 - 9

ELECTRICAL ENERGY IN INDUSTRY
(PERCENT OF TOTAL ENERGY) 1970 - 1987



Introduction of Irving K. Fox

Chris Boatman
Conference Chairman
B.C. Hydro

Introduction of Irving K. Fox by Chris Boatman

I'd like to move on to our next speaker now whose going to speak to us on "Lifestyles and Energy Use in British Columbia". He's Irving Fox, who is Professor Emeritus, Community and Regional Planning at the University of British Columbia. Irving Fox was a Vice-President of Resources for the Future Inc., a non-profit natural resource research organization, before joining the academic community, first at the University of Wisconsin and subsequently at U.B.C. He is a political scientist and community and regional planner whose particular area of expertise is in Water Resource Management. He now lives in northern British Columbia, residing in Smithers, thus bringing a northern prospective and expertise to our analysis of lifestyles in electricity use. Please join me in welcoming Irving Fox.

Lifestyle and Electricity Use in British Columbia

Irving K. Fox
Professor Emeritus
University of British Columbia

When I began working on this presentation, I asked myself what is meant by the term "lifestyle", so I went to the dictionary and found that Webster defined it as:

> An individual's typical way of life; his attitudes and their expression in a self-consistent manner as developing from childhood.

Lifestyles of the people of British Columbia differ widely, but there is one general lifestyle type that dominates in British Columbia, as it does in most of North America. Not everyone follows it, and some do not adhere to it consistently but I believe that the prevalent lifestyle of the majority of the population can be characterized as follows:

> The pursuit of higher incomes in order to have more goods and prestige and greater personal comfort.

This characterization does not apply equally to everyone. Some are content with a modest level of material welfare; some seek to accumulate a great deal of personal wealth; others seek power and a high level of prestige among their peers. However, I believe that the lifestyle I have characterized dominates the behaviour of our political and economic system. Implicit in this way of life is the need for growth of the economy at a rate that is more rapid than the growth in population.

In my presentation I will discuss this dominant lifestyle and compare it with an alternative pattern. After making this comparison, I will speculate on the effects of such an alternative pattern on electricity use in British Columbia. Then, I will examine a series of questions relating to whether we need to dampen electric power demand, whether a change in lifestyle would be required to dampen demand, and whether a change in lifestyle is in the cards. Finally, I will suggest how B.C. Hydro might respond to the concern about the relationships among lifestyles, electric power use, and the planetary ecological crisis.

Before proceeding you should be aware of a premise underlying my examination of lifestyles and electricity use. My premise is that growth in per capita material income is not compatible with indefinitely sustainable resource use. But a per capita improvement in the quality of life of Canadians is sustainable, attainable, and compatible with our obligations to the rest of the world.

The Dominant Lifestyle

In terms of the criterion of economic growth, the economies of Canada and British Columbia have been successful. Economic growth has been much more rapid than population growth, and electricity use as an important ingredient to the economy, has also grown rapidly. Per capita residential use of electric power over the 19 years that I have lived in British Columbia has increased by about 75 percent and per capita total use of electric power has also increased by about 75 percent. An important question is whether we should endeavour to replicate this pattern in the future. B.C. Hydro's forecasts of future electric power demand assume that we will continue on this path, albeit at a somewhat slower pace.

Our prevalent lifestyle is associated with identifiable perceptions and attitudes. If our lifestyles are to change with a resultant reduction in electricity use, either in absolute terms or in terms of the per capita use of electricity, I believe that a major change in these perceptions and attitudes would be required. These present perceptions and attitudes seem to me to be based on the following premises:

First, that the increase of material goods and creature comforts is correlated with increases in personal well-being.

Second, that the general welfare is best served by competition among self-interested organizations and individuals. This principle guides the design of economic and governmental institutions.

Third, that bigger is better. Big cities are better than small cities. Large-scale organizations are more efficient than small organizations. Therefore, the private sector requires large corporate enterprises and governmental responsibilities must be centralized in Ottawa and Victoria.

Fourth, that technology will find a way to deal with environmental degradation and shortages in the supply of natural resources, as it always has in the past.

Fifth, that the world must be regarded as a single economic unit, and international trade as well as the movement of capital, must not be inhibited by national and provincial policies and practices.

The foregoing perceptions and attitudes are the underpinnings of our lifestyle. They manifest themselves in our relentless effort to increase Gross Domestic Product (GDP) and this effort has met with considerable success. Large international corporate enterprises are encouraged to invest in B.C. and today they play a major part in the Provincial economy. Governmental activities are highly centralized in Victoria and Ottawa. Population is concentrated in a few very large urban centres. Canada plays an active role in GATT, a free-trade agreement has been reached with the United States, and there is talk of extending this free-trade area to include Mexico.

But there is a down-side to this picture. High income levels have been made possible in part by federal borrowing from abroad. Unemployment rates are high in British Columbia and many other parts of Canada. Greater Vancouver is suffering from a serious lack of affordable housing, traffic congestion, and a deterioration of environmental quality. In many parts of the Province, drug and alcohol abuse, and crime rates are on the rise. Unemployment and social conditions among the native people are a serious concern. There is widespread view that Crown forests are being over-cut and landscape qualities responsible for the appellation "Supernatural British Columbia" are being impaired. The long-range sustainability of our agricultural and forest resources and the maintenance of biological diversity are being seriously questioned. And looming on the horizon is a global ecological crisis, to which we in this Province have contributed, involving potentially catastrophic climate changes, depletion of the ozone layer, overpopulation, a deterioration of food production capacity, and an overwhelming waste disposal problem. This is causing many people to question the basic precepts that underlie our present lifestyle.

An important question is whether the social and cultural well-being of people generally has been advanced through the increase in income that has taken place. In thinking about this question, I am reminded of my own experience. I was born and raised in a rural area in northern Michigan where I attended a one-room country school. My father operated a general store which sold everything from groceries to women's dresses, gasoline and dynamite. We also had the post office and the railroad's ticket and baggage agency. We had 40 acres, cows and chickens, an apple orchard and a large garden. It was a family-operated institution and all of us worked like hell. But there were dances on Saturday night, a community baseball team that participated in a county league, and a drama club that put on performances during the winter. There was swimming and fishing in nearby lakes and streams during the summer, hunting and a trapline to tend in the autumn and skiing and sleigh rides in the winter moonlight. And it was in this environment that I was introduced to the exciting world of books. We had no electricity except that supplied by batteries which powered a small radio I had assembled.

My sister, brother and I have often noted that the quality of life we enjoyed was much higher than we have been able to provide our own children who were raised in more affluent circumstances than we were. While I admit that I do not want to give up electricity and the amenities that it provides, the point is that it is not essential to a high quality of life. In fact, for 18 months after we moved to Smithers in 1983 we lived in a 20-foot by 20-foot cabin without electricity and running water, and my wife and I have never been happier. Now we have electricity and we are slaves to two computers. I am suggesting two things: First, a high quality of life is not directly correlated with an increase in conventional income. Second, in a world faced with prospects of population growth posing impossible demands on resource supplies, we should think hard about what are, in fact, the determinants of a high quality of life and the minimum resource requirements of a lifestyle that will achieve such quality.

An Alternative Lifestyle

Recently I read a book (Herman E. Daly and John B. Cobb Jr., "For the Common Good", 1989) that advocated an alternative lifestyle in the interest of finding a way of life compatible with the sustainability of planetary resources. I interpret the lifestyle proposed to be as follows:

> A way of life in which individuals are motivated in large part by the pursuit of community welfare. This way of life should be designed to produce a comfortable level of material goods, sustainable use of natural resources, and a high quality of life for all through the cooperative efforts of members of the community.

The term high quality of life requires definition. As used by the authors of the book to which I referred, it includes the opportunity to enjoy good health, the opportunity to be associated with and feel at one with the natural world, to interact constructively with other members of a community, and the opportunity of each individual for self actualization, i.e. to engage in stimulating and creative activities. This is a large order and would require a major change in perceptions and attitudes by a large proportion of the population. The perceptions and attitudes associated with such a lifestyle would be based on the following premises:

First, that well-being should be measured in terms of the quality of life one enjoys.

Second, that the pursuit of community welfare must be the major motivation underlying the attainment of a high quality of life; self-interest is a secondary motivation.

Third, that technology alone is incapable of preventing the catastrophe threatened by the world ecological crisis.

Fourth, that "small is beautiful". Enterprises should be no larger than necessary to realize economies of scale. Governments should be decentralized to regions, cities, towns and villages. Public policies should discourage the growth of large cities and urban agglomerations.

Fifth, that community welfare and community self-sufficiency should be pursued from the local level to the national level. (The nation is regarded as a hierarchy of communities). Local and regional communities should exercise leadership, with encouragement and support from higher levels, in promoting the establishment of regional enterprises to provide employment opportunities.

Sixth, that international trade should be limited to cases in which such trade enhances domestic community welfare; capital accumulated within the country should not be free to move out of the country except as part of a specific program designed to aid Third World countries. Efforts to assist Third World countries should be limited to direct assistance programs for individual countries which are designed to deal with the specific kinds of problems a country faces.

It should be kept in mind that these attitudes are not independent of one another. For example, community welfare motivations will not govern our lifestyle if we continue to believe that bigger is better.

The kind of economy envisioned by the foregoing perceptions and attitudes would essentially constitute pursuit of the kind of capitalism envisioned by the classical economists, including Adam Smith and Ricardo. They assumed competition among a large number of enterprises of modest size. They believed that capital should not be free to move out of a country. And they believed that international trade should be limited to those specific situations in which the trade specifically advances the interests of the two countries involved. Local communities and small cities are regarded as being more capable of fostering a higher quality of life than larger cities. It is noteworthy that a recent study of environmental, social and economic impacts of urban growth in 192 U.S. cities found that smaller cities had the best ratings on the 11 indicators applied in the study.

With this kind of lifestyle, the sense of community is an energizing force in society and people in localities and regions are the driving force for the economic and political life of the Province. Its basic premise is that the enlarged role of local and regional institutions in the management of economic and political affairs would result in the pursuit of a different ethic than is reflected in our present lifestyle. Individual self-interest would be muted by the social pressures to serve the welfare of the community. My experience living in Smithers has convinced me of the validity of this premise.

Before considering the matter of lifestyles and future power use in British Columbia, there are a couple of questions that need to be addressed. First, is there any reason for B.C. to dampen its use of electric power, except as required to realize more efficient use of supplies? Second, do we need to resort to a change in lifestyle, in order to limit growth in electric power demand by an appropriate amount, if a dampening of demand is deemed to be desirable?

Do we need to dampen electric power demand in view of the Province's enormous hydro potential?

My answer is that dampening demand should be a matter of high priority. Hydro development is not environmentally benign. While it doesn't contribute carbon dioxide to the atmosphere, new projects will invariably destroy tree cover which reduces the amount of carbon dioxide absorbed from the atmosphere. Site C will inundate valuable agricultural land. In view of the degradation of agricultural resources throughout the world, including Canada, and millions faced with starvation, can we afford to reduce our agricultural potential by a single hectare, especially in view of our current dependence upon foreign sources of agricultural products from lands (such as in California) where agriculture is not sustainable over the long term? Of major importance, increased electric power use per capita is associated with increased acquisition of material goods for our individual use. Is it morally defensible for Canadians to grow in affluence in a world in which millions live in misery and face a mounting threat of starvation, a world which clearly cannot support our level of affluence on a global scale? Should it not instead be turning its energies to aid these poor countries in solving their problems on a sustainable basis?

Can we dampen demand for electric power significantly, without changing our lifestyle?

There are, no doubt, opportunities for using energy more efficiently and thus lowering the amount of energy required per unit of output. B.C. Hydro is already taking commendable steps in this direction and I suspect that there are additional opportunities for increasing the efficiency of electric power use, but I question whether efficiency increases alone will result in a dampening of future electric power demand to the extent called for by current conditions in the world.

Theoretically, B.C. Hydro could increase the price of electricity by substantial amounts above cost in order to discourage electricity use. However, this would meet the considerable opposition from industry because of a claim that it would discourage industrial growth. If our present lifestyle continues to reign, residential consumers would also undoubtedly oppose such a policy vehemently. One could conceive of ways to solicit the acquiesence of consumers, but it is evident that to achieve an appreciable reduction, commercial and industrial demand must be dampened as well. In short, a significant reduction in electric power use will require the abandonment of the materially-driven economic growth ethic.

The Effect of an Alternative Lifestyle on Electricity Use

How would a change to an alternate lifestyle affect the use of electricity in British Columbia? Any response to this question must be highly speculative, but one cannot back away from addressing it.

The advocates of this alternative lifestyle argue that one of its effects would be to reduce GDP, which in turn would result in lowering the amount of electricity use. GDP would be reduced for several reasons. First, and of foremost importance, the drive of large corporations to promote rapid exploitation of the forests and other resources of the Province would be muted by public perceptions and the controls exercised by local people. The pressures to produce, advertise, and consume would be greatly reduced. Second, if growth of southwestern B.C. is dampened, the amount of income that would otherwise be required by the inefficiencies associated with life in large urban areas would be reduced. These inefficiencies, such as the high cost of constructing and servicing housing and commuting long distances to work, show up as a contribution to GDP. Third, the rewards of community life and the additional security that the lifestyle affords, would reduce the ever-growing pressure for material advance. A substantial reduction in GDP should result in a commensurate reduction in the demand for electric power.

Would the alternative lifestyle result in a high level of unemployment? The advocates of this lifestyle have confidence that community promotion of economic activities to serve a more self-sufficient economy would succeed in fostering a high level of employment. If there is reasonably full employment, wouldn't the alternative forms of employment result in using the same amount of electricity as we now do? The advocates of the alternative lifestyle argue that employment would be more labour-intensive. Instead of electricity-intensive pulp mills and highly mechanized sawmills, people would be engaged in a more intensive agriculture, in the fabrication of wood products that require considerable processing, and in serving the tourist industry. (It is noteworthy that in the state of Washington, the state economy realizes twice as much income per cubic metre of wood harvested as does British Columbia.) There seems little doubt that pursuit of the alternative lifestyle would result in less total money income, but this income would be more evenly distributed and the decline would be offset by a higher quality of life.

To consider this matter in a little greater depth one must consider how electric power is used by the economy of British Columbia and the pattern of use we must anticipate in the years ahead if we continue to pursue our present lifestyle. Some relevant facts that must be taken into account are the following:

1. Industrial use accounted for approximately half (44 percent) of total electricity demand in 1988/89; commercial use about 25 percent, and residential use about 28 percent.

2. Paper and allied products have been demanding a rapidly increasing amount of electricity. Between 1980/81 and 1988/89 this sector increased its use by about 64 percent in comparison with a growth in total industrial use of about 34 percent. B.C. Hydro's forecast identifies paper and allied products as one of the main growth sectors through 1999.

3. The population of the Province is expected to grow by 1.6 percent per year through 1999, Gross Domestic Product by 2.8 percent per year, residential electricity use by 2.2 percent per year, commercial use by 3.4 percent per year, and industrial use by 3.2 percent per year. These calculations lead to an increase in overall per capita electricity use in B.C. of 19 percent during the decade. The per capita increase in residential use would be eight percent, for industrial use the per capita increase would be 21 percent, and for commercial use it would be 22 percent.

Should there be a decline in GDP accompanied by an improvement in the quality of life, it is reasonable to conclude that the eight percent increase in per capita use for residential purposes would not materialize. In view of the growing emphasis on providing services demanded by the tourist industry, electricity use for commercial purposes could rise as forecast. Industrial demand could be dampened a great deal because of the decline in influence of large corporate enterprises and the reduction in controls exercised by the Provincial government.

Since 44 percent of B.C. Hydro sales in 1988/1989 were to industrial consumers and 48 percent of the projected growth in sales over the following ten years is forecast to be made to industrial users, lifestyles will have to influence industrial use of power if they are to reduce power use by industry significantly. The way in which an altered lifestyle might influence the growth of pulp and paper production, one of the major industrial users of electric power, is well-illustrated by the Pulpwood Agreement proposed by the Provincial government as it applies to the Kispiox Timber Supply Area (TSA). Under this proposal 250,000 cubic metres of timber could be harvested each year over a 25-year period from areas outside of the area on which the Annual Allowable Cut of the TSA is based. The area from which the timber would be taken is classified as "inoperable". The Agreement, which would cover a number of other TSA's in addition to the Kispiox TSA, is designed to promote the development of additional pulp and paper mill capacity. If the large multi-national corporations were not pressing for wood supplies for more pulp and paper mills, the Pulpwood Agreement would not have been proposed. Furthermore, virtually all interest groups in the Kispiox Forest District have voiced strong opposition to the proposal. Certainly, if the matter had been left up to a local regional jurisdiction such a proposal would never have been advanced.

But one may ask whether a change in lifestyle is in the cards? On the pessimistic side, one can argue that the outlook for change is very bleak for quite practical reasons. Canada has committed itself to trade and investment policies interwoven with those of the United States (and possibly Mexico) and to a lesser extent with the rest of the world. A major change in lifestyle will mean disentangling itself from these arrangements because they are postulated on the need for continued economic growth. Furthermore, the international corporate structure has a powerful hold on the political and economic policies of British Columbia. A recent study indicated that four major interlinked groups of companies control "93.2 percent of the allocated public forest cut and 84.1 percent of the overall provincial timber cut in British Columbia". This corporate structure can be expected to give lip service to sustainable development and encourage such mild changes as recycling of wastes, but they can be expected to oppose strongly a return to a classical capitalistic system and a compromise of the growth ethic.

Furthermore, from a social-psychological point of view, one might ask whether urbanization, industrialization, and mechanization has caused us to lose our spiritual connection with the natural world and weakened our capability to protect the ecological system on which mankind depends. If the artificial environment in which most of the increasingly urbanized society of B.C. and Canada now live has become all-important, do we have the vitality, the feeling of urgency, necessary to make a change in lifestyle that might reduce our material income? Instead aren't we likely to build more dams and flood more valleys and rationalize the enormous environmental losses associated with such developments as being necessary to maintain the standard of living to which Canadians are accustomed?

Yet, I believe there are grounds for hope. I believe that it can be demonstrated that a change in lifestyle can provide a more secure and rewarding existence. People are becoming very concerned about environmental degradation in Canada and the world ecological crisis. It is heartening to see the sensitivity to the crisis of young people, tomorrow's leaders. Events in Eastern Europe indicate that when a social movement takes hold, change can come about very rapidly. If political leaders can develop practical ways for making an orderly transition to a different lifestyle which promises a rich quality of life, they will capture public imagination and a major change in lifestyle will come about.

The Role of B.C. Hydro

What should be the role of B.C. Hydro with regard to world, Canadian, and British Columbian ecological conditions? Does it have a part to play in moving to a lifestyle more compatible with the preservation of the integrity of ecological systems?

In thinking about this question, I find convincing the argument that the decade of the 1990s should be regarded as the turn-around decade in which the countries of the world get on a course of clearly sustainable resource use. I believe that B.C. Hydro, as a major supplier of energy in this part of the world, has an ethical responsibility to contribute a fair share to this turn-around. I suggest that the discharge of this responsibility has two aspects:

First, B.C. Hydro should not develop or encourage the development of additional electricity supplies which contribute to global warming, reduce food production capabilities, or which in any other way adversely affects the sustained use of the natural resource base.

Second, it should not apply pricing or power distribution policies that foster economic growth. Instead, it should endeavour to design its program to foster the development of a society with no economic growth, but with an advancing quality of life and an equitable distribution of income.

I have no doubt that the development and implementation of policies and programs of this kind will pose major difficulties for B.C. Hydro. These difficulties arise in part because of the pressures it might be under to go on as in the past with only minor adjustments in response to ecological conditions. In addition, it will require a great deal of imagination and ingenuity to change course and design policies and programs to advance the quality of life.

If B.C. Hydro considers the possibility of playing a significant role in adapting to world ecological conditions seriously, it must work in harness with an informed public, because I suspect that it can achieve very little without strong public support. This means that the first step that B.C. Hydro must consider is what kind of information must the public have in order to react responsibly to the possibility of reorienting its policies and programs in the manner I have suggested. Unfortunately public resource agencies in British Columbia have done a poor job in communicating with the public on the basis of a clear illumination of policy choices that merit consideration.

To promote discussion of this matter, I will propose a broad outline of how B.C. Hydro might pursue a constructive role in responding to the world ecological situation in the context of the readiness of public opinion for a change in lifestyle.

First, I suggest that B.C. Hydro develop a set of policies and programs for the 1990s that would constitute an alternative to the policies and program that it has announced. These alternative policies and plans would have the following objectives:

1. To provide a transition to a non-economic growth society after 2000.
2. To avoid construction of additional dams or thermal facilities during the decade. (Some additional supplies could be provided through facilities at Keenleyside and Murphy Creek, purchase of ALCAN power, and return of the Canadian entitlement to downstream Columbia River power.)

In order to develop a program to achieve these objectives, B.C. Hydro would need to make a thorough investigation of alternative opportunities for reducing demand of centrally provided power to levels that can be accommodated without constructing additional dams and thermal facilities. The program that emerges from such an investigation would probably include the following features:

1. Continuation and extension of the Power Smart program to cover additional user groups and additional types of power using facilities as well as continuation of the Resource Smart program.
2. Apply pricing policies that will encourage a major reduction in power use for non-essential needs. These policies would take into account marginal economic costs and a factor that reflects the damages that additional power use would impose on the ecological system. They should apply to all three of the major user groups - residential, commercial and industrial.
3. Encourage the use of decentralized solar and wind generation where feasible to reduce demands on the B.C. Hydro system.
4. Provide community assistance (possibly including subsidies) for the development of low-energy, environmentally benign employment opportunities to replace the electricity-intensive enterprises that cannot afford the higher prices for power.

Implementation of these policies may be fairly expensive, but they would avoid the $3.5 billion investment in Site C, as well as a divisive political battle over its construction.

In addition to the foregoing program for the 1990s, B.C. Hydro should also develop the preliminary design of policies and programs for limited growth of electric power use between 2000 and 2020. Growth would be permitted only if it is required to support programs that clearly advance the quality of life and if the provision of additional supplies will not adversely affect the planetary ecological situation.

The two alternative policies and programs outlined above, together with the plans that B.C. Hydro has already announced and an assessment of the economic and ecological implications of each set should be distributed widely to the people of the Province. Following this distribution, the announced plans and the alternative plans should be discussed at public meetings held at locations throughout the province. A conscientious effort should be made to couch the distributed material and the meeting presentations in neutral lay terms. The objectives of these meetings should be to aid people in understanding the implications of the alternative courses of action that might be pursued and to elicit public reactions to the alternatives.

I believe that this approach would attract a great deal of public interest and discussion. No doubt there would be widespread reaction in the press and in meetings and conferences throughout the Province. Political leaders in turn would seek to understand the majority preference. No doubt some would endeavour to manipulate public opinion but if the alternatives are well developed and neutrally presented, manipulation would be difficult.

In contrast with the authoritative planning processes that Provincial agencies and B.C. Hydro generally pursue, the approach outlined would accord with democratic principles. Furthermore, B.C. Hydro would have clearly fulfilled its responsibility to indicate to the public what needs to be done to generate and distribute power in a manner compatible with world and Provincial ecological needs. I am betting that the public would opt for policies and programs that would entail a change in lifestyle, and that the international corporate sector would vehemently oppose such a change.

Thanks to Irving Fox from Chris Boatman

Thank you very much Mr. Fox. I have not been very successful in keeping us on schedule, but like the rest of life, where we suffer is going to be in our recreation. So I am going to take this opportunity to call for a coffee break a little earlier than scheduled. I now have 10:23 on my watch so we will take a ten-minute coffee break. When the bill rings we'd like you to come back so we can carry on with our final speaker of this morning.

Introduction of Ed John

Chris Boatman
Conference Chairman

Introduction of Ed John by Chris Boatman

Our final speaker is Ed John, who is going to speak to us about the Native Indian perspective on energy use and the environment. Ed John is a lawyer, President of the Tenizul Timber Limited, and a resident of Prince George. Mr. John is the hereditary chief of the Lasilyu Clan of the Tl'azt'en Tribe of the Carrier Indian Nation. For four years Mr. John served as a tribal chief of the Carrier Sekani Tribe Council. He has held many positions in the Native Indian community and holds a directorship in B.C. Rail. He sits on the interim board of the proposed University of Northern British Columbia. Would you please join me in welcoming Ed John.

An Aboriginal Perspective on Energy Use and the Environment

Ed John
Former Chief of the Carrier Sekani Tribal Council

Thank you Mr. Chairman, ladies and gentlemen. What I wanted to discuss with you deals with the topic of "Energy Use and the Environment". I listened to that wonderful presentation by Hazel Henderson last night about the re-examination of lifestyles and her comments about moving from a democracy to a "media-ocracy". I think that in light of the fact that the world is becoming smaller and smaller as technology becomes more widespread, I think maybe we should talk about going from democracies to "mediocracies".

These Forums, in my view, may become an important method for government and utilities, such as B.C. Hydro, to review policy and plans. To me, they are generally times to reflect on the past and times to think about the future. In essence, lifting mirrors up to ourselves to examine what we are doing. In this respect, the mirror that I want to hold up deals with an aboriginal mirror. On this matter, of our people, and my topic, "An Aboriginal Perspective on Energy Use and the Environment", I want to tell you a story.

A few years back, an elderly gentlemen from my community in his nineties travelled with me by jet on a winter evening to Vancouver. On our trip, I told him that we were flying approximately 500 miles in one hour. This was his first time in a jet. He looked up at me and said (translated from Indian), "My son, these white people are very clever." When we arrived in Vancouver and were flying over the city, he was amazed by the size of the city in the dark and by the lights that glittered in the night. He said again to me (translated from Indian), "My son, these white people are very clever." Then I told my elder about the lights and the electricity it used, and where and how electricity was generated. I explained to him how dams were constructed, land flooded and water impounded. I explained what had happened within the Carrier Sekani Tribal territory (our territory), and to the Chesladi Indians in the 1950s when Alcan constructed Kenney Dam and flooded the vast territories behind the dam, and how the Chesladi people were forced to move from their villages to get away from the rising water. I explained to him how the people were trying to negotiate with government and Alcan but were told that they had no option but to accept the deal that was offered. I also explained to him, later on when the spillway was constructed and water released, how our sacred burial ground had been flooded and washed away and how coffins were found floating in the lake downstream. He listened intently as I explained about the Sekani's of Ingenika who, in the late 1960s, were dislocated from their lands by the flooding of the B.C. Government's and B.C. Hydro's Bennett Dam. I explained how their trap lines, cabins, boats, motors and belongings were lost, and how the "singing days", as the Sekani's call it, were gone. When I finished he turned to me and said (Indian translation), "Son, these white people are not very good people." I guess that pretty well sums up the aboriginal perspective on energy projects, and particularly those ones in the Carrier Sekani Nation's territory.

As we heard this morning, energy comes from many different sources. Aboriginal experience in this area has been primarily felt where our lands and communities have been taken to make way for major hydro development projects. I guess here I use the word "development" advisedly. Many, but not all of our communities, are served with hydroelectric power. For example, the Sekanis at Ingenika do not have any power in their community although right next door to them is the massive Williston Reservoir. Some of our communities do have access to hydroelectric power. Our homes, our offices and our schools have electricity. To us it has become a tremendous convenience, as I am sure it has for many of you. Our homes now have freezers where once all of our meat and salmon were smoked and dried in our smoke houses. Now some of this meat goes into the freezer. I don't know why. Many of the elders complain about the taste. It's a question of lifestyle, I guess.

Like many communities who have access to electricity, we see the benefits. We have to ask these questions:

> At what price should these development projects be developed?
>
> Where is the cutoff line?
>
> What processes should be used to develop plans for these projects?
>
> Are these processes fair?
>
> Who should have access to these processes?
>
> In addition to the consultation in the planning processes, what fair public process exists for review of plans which are developed?"

In the past our people were silent. We didn't really have much to say in opposition to what was happening within our homelands.

There is a story amongst our people that long before the arrival of the Europeans, long before the arrival of the white man, our people had heard stories about the white people in eastern Canada. Our ancestors gathered and discussed what they should do with these people when, and if they should arrive. Some said, that if they came we should kill them. Others said no, they have white skins, they may be the ghosts of our ancestors coming back, and we shouldn't touch them. In the end, the early explorers and settlers came into our lands, our people helped them. During periods of hard time our people helped the early explorers with food and shelter. Like electricity nowadays, these people brought with them tools of convenience - knives, axes, guns, traps and so on. As the old saying goes, "The rest is history."

Since Columbus set foot in the Americas in 1492 and since explorer Alexander McKenzie travelled by this town (Prince George), here on the "Lht'a koh", as we call it the "Fraser River", on his way to the Pacific, the face of our tribal territories, the Americas and the world has changed. We have seen the advent of the iron horse and steel tracks. We have seen the advent of the airplane, the jet and have seen the world shrink. We have witnessed the transformation from the wagon to the 4x4. Man has gone to the moon and back. We have seen atomic energy and Hiroshima. We have seen nuclear energy, microwave ovens and Chernobyl. We have seen the evidence of acid rain. We have seen hydroelectric dams, electric energy, telephones, satellites, FAX machines, electric kettles, toasters and so on. All of these are achievements, and rightfully people should be proud of them. All of these achievements can be called progress.

For us, as aboriginal people, what has been the price of this progress? We are no longer masters in our own homelands. We are considered "wards of the state", not capable of handling our own affairs. We have a special federal government department to do this for us. Our homelands have been changed by logging, dams, mining, communities, roads and so forth. Our people have small parcels of lands reserved for them for our use and benefit. We have been reduced to beggars in our own land. Unemployment levels are excessively high in our communities. Your jails are filled with our people. Our graveyards are full of our people who have died from alcohol, drugs and disease. Our populations have been decimated. Our children have been taken away, in their best interest by your governments to be educated in distant cities. Many of them have forgotten or do not know who they are, or where they came from. Our children were taken and put into residential schools, again in our best interests, and in the process our languages and cultures have become remnants of what they used to be. Our potlatches and sundances, important to the survival for our people, were outlawed by government.

Our people were not allowed to be involved in your so-called democratic institutions until the late 1940s for provincial elections, and the early 1960s for federal elections. Today, as indigenous peoples looking for a voice, we are struggling for the very survival of ourselves as indigenous peoples. To me these reflect various aspects of life and the lifestyles of aboriginal people.

We ask Canada to listen to us, but it gives us welfare and work-opportunity programs. We ask Canada to listen to our political aspirations, but no, Meech Lake is far too important. We ask Canada to recognize what is left of our traditional governments, but Canada gives us the Department of Indian Affairs program called "Self Government" and more Welfare. We ask Canada to recognize our title to our lands, but we are told that our lands belong to somebody else. For our people, government legislation and policy have only been the poor shadow of justice.

What is left of the legacy of our land, our resources, and our way of life left to us by our ancestors? They left behind no monuments. They left no dams or reservoirs named after them. They left no pyramids or acid rain. Our elders tell us we are born into this world with nothing and when we die we take nothing back with us. They tell us that we are just visitors here, and that we should act like visitors on this earth. When we leave, we only leave behind our memories. Our elders tell us that the earth is like our mother because it feeds us, it clothes us, it warms us. We should treat her with respect and dignity like we treat our own mothers.

This message, and others, is a legacy left behind by our ancestors. These are the memories they leave us and which we share with you. In 1990 we often hear the term "sustainable development" made popular by the World Commission on Environment and Development. Environmentalists, industries and governments have embraced the concept. Each has its own interpretation. What we see now is a fight for the control of the so-called "environmental agenda". Who will win this fight? What legacy will we leave our children, and their children, and the next ten generations of our children? I worry about future generations and their ability to meet their own needs. So what do we do? We are in the post-industrial wasteland talking about our very survival and the survival of our earth. The Brundtland Commission in considering our common future had this to say:

> "Sustainable global development requires that those who are more affluent adopt lifestyles within the planet's ecological means, in their use of energy, for example. Yet in the end, sustainable development...is not a

> fixed state of harmony but rather a process of change in which the exploitation of resources, the direction of investment, the orientation of technological development and institutional change are made consistent with future as well as present needs. We do not pretend that the process is easy or straightforward. Painful choices have to be made. Thus in the final analysis sustainable development must rest on political will."

I must add to this public will which, in most cases, in democracies or other forms of governments generally have the political will. With respect to aboriginal indigenous peoples the Brundtland Commission had this to say:

> "In terms of sheer numbers, these isolated vulnerable groups are small but their marginalization is a symptom of a style of development that tends to neglect both human and environmental considerations. Hence a more careful and sensitive consideration of their interests is a touchstone of sustainable development policy."

The Commission went on and said:

> "Their isolation has also meant that a few of them have shared in national, economic and social development. This may be reflected in their poor health, nutrition and education. Many live in areas rich in valuable natural resources that planners and developers want to exploit and this disrupts the local environment and so as to endanger traditional ways of life."

And the Commission concludes:

> "Tribal and indigenous peoples will need special attention as the forces of economic development disrupt their traditional lifestyles. Lifestyles that can offer modern societies many lessons in the management of resources in complex forest, mountain and dry land ecosystems. Some are threatened with virtual extinction by insensitive development over which they have no control. Their traditional rights should be recognized and they should be given decisive voice in formulating policy about resource development in their areas."

I have made extensive references to the Brundtland Commission report because it talks about "sustainable development". It talks about how the planning of sustainable development economies into the future should consider many aspects. One of these aspects is the role of the indigenous peoples. They referred to this as a touchstone of modern development. In the fullness of time and in light of developing national and provincial policies, where will the aboriginal peoples fit in? Where will we fit in? We feel we have something to offer to this world and its future. If our involvement is welcome and our views count, what legacies will we collectively leave behind for the generations yet to come? The power to deal with aboriginal peoples in a just and equitable manner is in the hands of yourselves and government. The power to deal with the land and resources for the benefit of future generations, and for the benefit of our generation is in our collective hands. But we have to begin by taking care of the future one day at a time. By taking better care of and to respect our earth, our Mother.

I have to say to B.C. Hydro that some of the initiatives they have undertaken are very commendable. That the Forums, such as this, provide for a view, an exchange, and a review of the past; and to plan into the future. When the planning takes place, the consideration of all of the peoples in this province must be considered. We referred last night and this morning to a global context, but that global context must be examined in respect of each nation state and what it's doing for the people within that nation state.

I wish to conclude by telling you a story that illustrates where we are. A few year's back in the summer, we were cooking some salmon that we had caught. Some of the salmon was being cooked in aluminum foil and some of them were being cooked over a fire in the traditional way, upheld by sticks. We got to discussing the salmon, and the importance of the salmon in our life, and for our people. We discussed the Aluminum Company of Canada, Alcan, and what their plans were for the Nechako River, and the reduction of its water levels. We discussed the possible impact it may have on the salmon species in that river. When the salmon were cooked we put them on the table outside and unwrapped the aluminum foil. We looked at the salmon which we had cooked for ourselves, and when we unwrapped the aluminum foil we looked at ourselves and said, "This aluminum foil came from Alcan." That's a bit of the irony that exists, not just amongst the non-Native people, but amongst ourselves.

I think it's important that when governments and utilities, such as Hydro, are looking at plans and developing plans for the 1990s and into the twenty-first century, that the equation for sustainable development includes people. In that equation is your people and in that equation are the aboriginal peoples in this part of the world, and in many other parts of the world. I think when those equations are being considered, it is important to look at those people who are indigenous and to look at the relative role of those people. Everyone is talking about reducing lifestyles, or changing lifestyles, so as not to be as consumptive as the world has been in the past. The aboriginal peoples have a long way to catch up to whit people in terms of the kinds of comforts that our people have in our communities, compared to the kinds of comforts you have in your communities. Many of our communities don't have running water. Many of our communities don't have electric power. Many of our communities have 80, 90 and 100 percent unemployment. Those are the kinds of things that we have to put up with. I think that when Canada talks about its lifestyle, I think it should consider those lifestyles as well.

Finally, to conclude I guess my suggestion would be that seeing that B.C. Hydro has taken the Third Annual Electric Energy Forum out of Vancouver and brought it to Prince George, maybe the Fourth Energy Forum should be at Ingenika Point where there is no electric power. Thank you.

Thanks to Ed John from Chris Boatman

Ed, thank you very much for your very interesting commentary.

Introduction of Panel Discussion: Present Lifestyles and Our Electricity Use

Chris Boatman
Conference Chairman

Introduction of Panel Discussion by Chris Boatman

Ladies and gentlemen, this morning you've heard some very interesting speakers. I hope the panel discussion for the next hour will extend the debate and give all of you an opportunity to participate. I will ask the previous speakers and Dr. Henderson if they would take their places at the podium. I have a variety of questions to get the discussion started. Please feel free to write your questions out and hand them to the staff. We will try and get all the questions addressed. While our panel are taking their places, I'd like to take this opportunity to introduce a gentlemen who is going to chair this panel, Mr. Bill Matson. Bill is a Vice-President for Northwood Pulp and Timber Limited, and has served as a member of the Executive Board, and as Chairman of the Technical Section of the Canadian Pulp and Paper Association. He is also on the Board of Directors for the Pulp and Paper Research Institute and President of the Ontario Pulp and Papermakers Safety Association. He held positions with a number of pulp and paper companies before joining Northwood. Mr. Matson graduated from Queens University with a degree in Chemical Engineering. We are running late and Mr. John has an airplane to catch. He'll have to leave just before noon. If there are questions for Mr. John we can focus on those early. So I would now like to turn it over to Mr. Matson.

Panel Discussion Moderator

Bill Matson
Vice-President - Pulp
Northwood Pulp and Timber Limited

Thank you Mr. Chairman. Good morning ladies and gentlemen. I am pleased to have an opportunity to attend and I am sure it is going to be an interesting two days. I understand that some 80 of you visited Northwood yesterday. I have to apologize that half the plant was shut down for a number of reasons. The feedback that I got this morning was that we had a lot of questions and a lot of interest. I hope you got what you expected out of the visit.

We are certainly trying to keep the energy question in front of us all the time; but, what is happening in the world? We had the scare of the seventies, and we reacted to that. We did a lot of things conservation-wise, but I am afraid that we are slipping back into our old habits. I hope that meetings like this will bring some of those questions forward again, so that an energy scare doesn't come back to haunt us.

You see the things that are happening in the world, exemplified particularly in the U.S. (a big consumer nation). At the time of the second energy scare in the mid-seventies, they were importing some 50 percent of their oil requirements. They are now exceeding that today. You remember the alarm it created at that time. If it should happen again, it would be a lot worse. On the other hand, they have raised their speed limits on the highways. I was just in Florida last week and the price of gas was $1.00 per U.S. gallon. You wonder how serious they really are about it.

I am not here to criticize the U.S. because Canada is not very far behind in some of the things we are doing. Anyway, we are running behind and I'll be brief. But just a few other comments. A Forum, such as this, is an ideal situation for a wide cross-section of electrical users to get together to learn, to input and also to be heard on some very timely issues. The title "Lifestyles and Electricity Use" is extremely timely and appropriate as we enter the nineties and go forward into the next century. First of all, environment is probably the most talked about subject in our lives today. I am in the pulp and paper industry and I would think that 30 to 40 percent, or maybe more, of my time now is spent on environmental issues. We are certainly devoting a lot of our time to these issues.

The world-wide recognition of our human involvement in the environment was clearly demonstrated by the participation in Earth Day just a few weeks ago.

Electricity is related to the environment. The reason of course is quite obvious. No matter what form of energy we utilize, it will have some impact on the environment. Let's just list a few of the issues, as I see them, that are all energy- or electricity-related that we read about every day.

Electric energy generation as it relates to acid rain. This is from the use of high sulphur coal and carbon fuels in general. One of these days we might even face carbon taxes because of its impact on the greenhouse effect. You will probably hear more about that in the future. High ozone concentrations at ground level and holes at high levels. All petroleum products and our automobiles are a contributing factor to ozone problems. Nuclear power stations and the fears of the safety and exposures to radiation. Hydroelectric generation, dams, land and water source disruption. What about the secondary damage such as oil spills, and moving this energy around the world, tanker accidents and/or pipeline ruptures?

I even mention dioxin deposits, not without trepidation because our industry is front and centre. We have to realize that wood-burning plants and municipal incineration plants are contributors as well. Forest depletion, which you have heard something about. Vegetation disruption for fuel in some parts of the world, desert formation, which decreases the use of carbon dioxide by plants, resulting again in additional greenhouse impact. The list goes on. Some of these were mentioned by our speakers in their talks last evening and today. What we face now is the issue of lifestyle. This takes us to the key word in the Forum title. This, I would suggest, is the driving force behind our ever-increasing use of energy and electricity. So let's get on with the cost input.

Here is our panel and just let me re-introduce them to you. Dr. Hazel Henderson, the futurist, was your keynote speaker last evening. You all know who Hazel is, so we don't have to ask her to be recognized. She's the one second from the left. The panel is also made up with: Dr. John Foster, who you heard this morning, President of the World Energy Council; Mr. Irving Fox, Professor Emeritus of U.B.C.; and Mr. Ed John, lawyer and former Chief of the Sekani Tribal Council. As mentioned, Ed has to leave at about noon, so if you have questions for him please direct them to him prior to that time.

I have some written questions here and we'll try to sort them out. We are going to set microphones up for the panelists; but, until they are ready I am going to ask them to use the podium at the far left.

I will start with a question for John Foster.

Question to John Foster

We seem to have some level of control of energy consumption in our developed nations; but, what can we do about the underdeveloped countries, where basic survival is the name of the game, for example the burning of wood for heat and cooking, or land clearing for agriculture? Is world aid a feasible alternative?

John Foster

I don't know that world aid is an alternative. World aid is certainly a logical factor for improving the economy of these countries. I think that Hazel was mentioning last night that the Japanese are proposing an international Marshal Plan for the Third World. I think something like that would be very good. Not only for the Third World; but, for the industrialized world as well. It would all go to help with the development of those countries.

Question to Hazel Henderson

Is it going to matter that we are far more able to accommodate environmental concerns in our economy than the Third World?

Hazel Henderson

Well, as I was saying last night, I think there is just no way of sitting down at the table and working out the kind of lattice work of international protocols and agreements that we are going to need in the 1990s without the countries of the northern hemisphere showing leadership in changing their own lifestyles. I think a question that Mr. Bell raised last night, which really is a $64,000 question, was "Who goes first?" Where you have a global economy which rewards the most rapacious kind of behaviour and supports the whole idea that we have a global sort of free-for-all market, is part of our problem.

What I see as the way to go, is to level that global playing field. Not in the way that is currently being suggested under the old free-trade rules, where it turns into trashing every local culture and levelling forests around the world; but rather, to level the global playing field upward by putting an ethical floor under it. In other words, this lattice work of agreements, whether it's through the GATT or through UNEP or all of the various protocols that are being developed. The world runs on differentials, but we now have very destructive differentials around the world, large differentials in lifestyle, poverty, differentials in terms of the exploitation of resources and the environment which are permitted by various governments. These excessive differentials set in motion this crazy globalization process with companies going around the world looking for such differentials such as a cheaper labour force and/or an environment they can exploit. I think that if we can think about this international regime with this elevated ethical floor, then we can maybe change the game so that the most ethical companies will be the winners and the most ethical governments will be the most popular.

Comment by Moderator Bill Matson

If any of the other panelists have any further comments on any of the questions, even though they were not directed at you, we would appreciate you adding your comments. The mike can be passed across to you.

This one's to Ed John.

Question to Ed John

What type and amount of compensation would be acceptable to the aboriginal people impacted by Alcan's Kemano Completion Project, i.e. assist in rebuilding communities for instance?

Ed John

That question is a very difficult one. I don't think it's simply a matter of financial compensation, although it does help to assist in the redevelopment. These people, the Cheslada people, are looking at the redevelopment of their communities. If those of you who don't know, in 1952, with the signing of the agreements and with the construction of the dam, and the raising of the water, the people were moved from their communities and their main community of Cheslada Lake. They moved north of their own tribal area into another tribe's territory. The community was split up because the replacement lands that were purchased were small parcels of farmland scattered over a tremendously huge area. The people lost their sense of community and lost their sense of who they were. Consequently, in the 30 years since, this dislocation has played a tremendous role in the defining of who they are and the kind of difficulties that they have faced; for example, social problems within the communities.

It doesn't answer the question directly; but, what the governments and corporate entities should do is to take a sensitive approach to how those people are 46 really a simple question of financial compensation, but it seems that everyone wants to reduce it to that. They want a sense of community identity. They want a parcel of land set aside for them. They want some assistance in developing community facilities which they have lost. I don't want to get into the specifics of those negotiations because they are ongoing at the present time.

It's a similar thing with the Sekanis at Ingenika, although there's an agreement in place at the moment. They were affected very deeply by their removal from their tribal territory and moved south, away from their lands and their homelands. It's affected their community psyche, their community spirit in such a way that they refer to their days as pre-flooding days and post-flooding days. Everything is measured by those concepts, and they look at where they are now and what they would like to do. When you are looking at these kinds of issues, and considering plans for future impoundments or additional work that has got to be done into those communities, it's not really just a question of financial compensation. It's far deeper than that. It's far more serious than just paying somebody off, and then saying that we've paid them off, and that's good enough.

I think that in relation to the first two questions that were raised, you can put my answer into that context. We see our people essentially in Third World conditions in Canada. You see our people trying to develop their communities, our communities so that there is a decent standard of living for our people, that there are employment opportunities and so on. You don't have to look to the Third World countries. You don't have to look to Mexico. You don't have to look to South America. You don't have to look to African countries. You can look at the Indian communities in Canada to see what the Third World looks like.

Moderator Bill Matson

Thank you for that well thought-out answer.

Question to Irving Fox

Part 1: Please discuss the relationship between individual lifestyle changes and the commercial and industrial sectors.

Part 2: How effective can localized changes in lifestyle affect the other sectors?

Irving Fox

Well I think that I've got a bear by the tail here. It says, "...please discuss the relationship between individual lifestyles and changes, and the commercial and industrial sectors." I think that there is a very powerful motivation for the industrial sector, and the commercial sector to a more limited degree, to proceed with the effort to grow. Growth is really the life-blood, in many ways, of the increase in profits and the increase in income that the industrial and commercial sector will realize.

The individual, it seems to me, is a victim of this pressure to a certain extent. One of the things that we have to do is to provide an environment within communities which will moderate this motivation on the part of the industrial and commercial sectors. I think this can be done through de-centralization and we have moderate-sized communities rather than large communities, especially, if the industrial and commercial sectors are locally and regionally based rather than being part of a large organization that extends province-wide, nation-wide or even world-wide. That's why I believe that lifestyles cannot be changed without changing some other parameters, such as the way the government is organized, and the way industry is organized.

Now, let's see. The second part of this question is "How effective can localized changes in lifestyle affect the other sectors?" Well, I think it will have to begin locally. I think that when it does come locally, there has to be, at the same time, some changes initiated in other parameters. They must go together and that is going to be very difficult to do. It's one of the things that I am working on with the Westwater Research Centre at U.B.C. I don't suggest that it's easy; but, I think that one has to look to local and regional groups to take leadership and, in effect, take over some of the major controls, including controls on industry and by government.

Moderator Bill Matson

Here's one that probably all of you on the panel might have some comments on and it's directed to all of you. "How can any part of the natural world possibly be preserved, or even, how can natural resources be used "sustainably" without population control, or even reduction everywhere in the world?"

Would you like to try first Dr. Henderson?

Dr. Henderson

Yes of course population does have to be controlled. I think that as these issues first arose, at an environmental conference in Stockholm in 1972 which I attended, it was very clear to me, that this was going to be a north-south negotiating issue. Then most of the countries in the southern hemisphere put their finger right on the problem and said "don't you keep coming to us and talking about population control as long as it's fifty times more of a disaster in terms of chewing up the natural environment when an American child is born, rather than when an Indian child is born." So there was this whole thing and the conversation around population control for 20 years has been conducted in terms of what our friends call in the south "Indian equivalents". So, we are going to have to deal with that. There is a very interesting ramification now to the population control efforts made in Singapore, as Mr. Bell noted this morning, and also in the People's Republic of China, where those two countries have the most control on population (you know about the one-child policy in China). This was really a very public-spirited effort in terms of the planet. The Chinese now too are bearing the consequences of that, and that is a demographic transition which is catastrophic because it is so sudden. What you have in China is this one very small cohort of little emperors and little empresses, these only children. As they reach maturity in the next two or three years and begin earning money, they are going to have to support 25 to 30 old ones who have a life expectancy now of 70 years. I think we have to give them an "A" for effort. Those two countries, they really tried. We are going to now, in the North, do our part of the bargain, which is reducing consumption per capita.

Moderator Bill Matson

Dr. John Foster, do you have a comment on the population question?

Dr. Foster

I just agree with Hazel on that. The projections are that we are on our way from five billion people to about eight billion people by 2020. The curve is still pretty steep at that point. Somewhere it has to level off. This is all part of the earlier question about economic improvement in the Third World. I might have said 90 percent of that population growth is in the Third World. It's all part of the same question because for whatever the reasons, whether it's the higher stress of a richer society or TV sets, or whatever else, birth rates go down with improved economy. It's all part of that general question.

Irving Fox

I don't have too much to add, except that my own perception conforms to what the others have said. This is the number one problem worldwide. I don't think that we can deal with it constructively unless, as Hazel Henderson suggested, we provide an example in our own country of achieving a truly sustainable lifestyle. Then, we certainly have to lend our support to efforts in other countries to deal with the problem. I have no doubt that this may be the most perplexing as well as the most important problem that we face.

Ed John

To me, it's a very difficult question. I don't have the depth of experience these people have here; but for population control, I have to take from an aboriginal perspective. I think there's a pretty good population control in our communities right now. Not because we want it, but because it's there and it's been there in the past. In the past we had to deal with disease-infested blankets, small pox and so on. These have reduced our numbers substantially. I think that our people are now gaining a bit in numbers. We are happy, and now everyone is talking about population control. I guess it kind of works in reverse in some instances. We get our government grants based on per capita, so we are happy every time a child is born in our communities. It's kind of a difficult question for me. Population control mechanisms are not conscious-control mechanisms. When you look at our graveyards, there are a tremendous number of people there. Our people are dying at younger ages than the average. There are high levels of suicide in our communities among young people. In a very bad sense of the word that's population control, but it shouldn't be seen probably in the sense in the way you are looking at population control, i.e. saying we should restrict the birth rates to a certain level globally.

The world, in general, has very limited resources. The fish populations in the waters, the animal populations that feed our communities are limited. The land base that supports by way of agriculture and so on is limited. It seems to have been reduced for urban development and so on. All I can say is that I have read some things in that area, and I agree that it is going to be a very big problem, but then I am taking this from an aboriginal perspective. I agree generally with what's been said, but from an aboriginal perspective, a lot of what's been said is kind of meaningless to us.

Moderator Bill Matson

Thank you. This is a question for Mr. Fox, and maybe Dr. Henderson can comment also. "I have always believed that the basic economists premise that price governs our societies behaviour almost universally. If that is correct, can we fix our environmental and energy problems by taxing and pricing products?"

Irving Fox

With regard to pricing our products, I think it is a very important tool and for many years I have favoured taxing activities that result in serious external affects, such as waste disposal. Now I don't think that is going to work in all cases. I don't think one should consider it "the only instrument". I think it is an important instrument. It's one that we do not take full advantage of. I think that B.C. Hydro is talking about it and I think it was unfortunate that, as I understand it, B.C. Utility's Commission has limited what they can do in that regard to increasing prices for conservation purposes; but, I think that those of us who are members of the general public ought to be trying to get that kind of ruling overturned. I think that probably Hydro should go much further than they have contemplated in producing, let us say, discriminatory prices to achieve savings in the use of electric power.

Hazel Henderson

Well, just to go a little bit further than I was able to last night on the subject of prices and taxes. I think that the whole debate about taxing policy is well on the agenda and it was mentioned this morning that carbon taxes maybe something to contend with in the future. Well, I think carbon taxes are being enacted in many countries in Europe right now and so of course the price system is a wonderful feedback mechanism. I mean what we are talking about here, and I try to emphasize again, is that we are dealing with managing complex systems and we have to use feedback. Prices are only one form of feedback. That was really the mistake the neoclassical economists made and the fact that the price system did not include the full social and environmental costs; but, of course you can't expect all of those intergenerational costs to ever be factored into the price system. So that's why we need votes, which is another form of feedback, isn't it? That's why the instinct of all of the leaders in Eastern European countries to go for more feedback is so correct. They know they need the feedbacks of the price system and they need the feedback of votes. Then the only question is, "How many other important feedbacks have to be plugged in?" I would certainly say that probably today the most important is the mass media. When I talked last night about going from democracy to "media-ocracy" I really meant "media". "Media-ocracy" because already television is beginning to drive politics rather than the other way around. Then the feedback which Hydro is collecting, more vigorously all the time, is on public participation and probably frequent opinion surveys and talk programs on radio and television, good regulations. It's just a matter of designing these complex decision systems so that you can gather all the feedback, including of course that from Mother Nature, the acid rain and the dying fish stocks, the depleting species and all the rest of it.

Moderator Bill Matson

This whole question of pricing brought one thing to mind, my personal opinion in all of this excitement that we have over recycling. We ask ourselves, "What is really the driving force there? Is it genuine concern for the environment or is it this whole thing just a pricing issue?" I certainly think that the pricing question comes into it when municipal governments face very high landfill costs, if land is even available. Secondly, high tipping fees, which is a charge for hauling all of this stuff out there to landfills, and then that results in legislation, laws and bylaws and everything else that is happening around the world to do something about recycling. So the question is, "What is the driving force?" I will leave that with you.

I have a question here for John Foster.

Part 1: "If dams and fossil fuels burning are unacceptable can nuclear be developed to fill the void?"

Part 2: "How can Sweden handle their energy requirements in view of their referendum to phase out nuclear plants?" (You probably all know that they've got a law in the books to do that.)

Part 3: "Do you count peat as biomass or as young coal?"

John Foster

Part 1: "If dams and fossil fuel burning are unacceptable can nuclear be developed to fill void?" Well, of course I don't accept that dams and fossil fuel burning are unacceptable. If they were, the answer is not in any reasonable time because we have such a big system involved with dams and fossil fuels. It would take generations to be able to switch over to nuclear.

Part 2: "How can Sweden handle their energy requirements in view of their referendum to phase out nuclear plants?" Well as you saw from my charts this morning, Sweden gets about half of its electricity from its nuclear plants and the other half from Hydro. It has very little fossil fuels for electricity production. There was a referendum taken some time ago, that they would phase out their nuclear plants by 2010 and then after Chernobyl, Parliament decided to phase out four of them sooner than was originally planned.

However, we've had some meetings in Sweden and discussions with people in Sweden. They do not have any alternatives. They mention windmills for instance located in the Baltic offshore; but that's not a practical alternative for their energy supply problem. They are also ruling out the use of coal. I think they have a very good nuclear power program and I think it's only a matter of time before they recognize that and change their plans. They might phase out one plant, but I would be very surprised if they go beyond that.

Part 3: "Do you count peat as biomass or as young coal?" Since we usually use the term biomass to refer to organic material renewable in a few human lifetimes at most, peat should be regarded as young coal.

Moderator Bill Matson

To Hazel Henderson, a long one, but basically I think, a profound question. "Canada, with its second largest land mass in the world and a small well-trained educated population is the one of the last countries left with some of its options still open. What steps can we take to provide leadership and innovation in the environmental and economic arena, and in population control; rather than copy processes tried and possibly found wanting in other jurisdictions?"

Hazel Henderson

Well first of all, as an American citizen I feel I'm not equipped to prescribe any future course for Canada since we, in my country, are such energy hogs ourselves; but, I do think that focusing on the potential that Canada has, with such an enormous resource base and such a well-educated and small population, is a wonderful opportunity to take to open up the debate to all of the alternatives. As I was saying last night, what really surprised and delighted me, looking at the transcript from last year's program, was all of the ideas and creativity that was expressed in those workshops. I think that if there is more attention paid to really eliciting innovation, whether it's setting up national prizes to encourage entrepreneurial ideas or inventors or whatever, I really think that Canada could, and any country could, create a climate where the creativity of all of its citizens was really encouraged.

Part of the reason is that in very centralized, industrialized countries of both east and west, people are burned out. They don't believe their vote counts, and they feel they are too far away from these decision processes. If some real genuine effort should be made to involve people very actively in these great decisions you would get some good feedback. That was really one of the reasons why I talked about the conserver-society debate that was being encouraged at that time, mostly driven by the energy crisis, but I know they had town meetings and phone-in radio programs all over Canada.

In my State in Florida, we decided that the only way to deal with the future of Florida was to deal with the involuntary immigration going on. A thousand new residents move into Florida every week and we have this very unfortunate situation where we have to provide new infrastructure for them. They all came to Florida because we advertised ourselves as a tax-haven. I mean there is a real nasty set of circumstances and what we've realized is that the best thing that we can do is to run these alternative futurist visioning processes. Now we have matching grants in the state government where any county that wants to run an alternative visioning process can get funds. The whole process is really like a search conference and you bring all the stakeholders in the community together and they try to envision what they would like their town or their county to look like in the year 2000, 2008, 2010, or whatever. We probably have had about 15 counties make use of these funds now. It's amazing the creativity you get, and that you get the newspapers involved and the radio and television stations. Then of course, to complete the loop, people must see goodwill and evidence that their ideas were listened to.

Moderator Bill Matson

I know Ed John has to leave in a few minutes and here's one that he can handle before be runs out the door. Do you believe that aboriginal native peoples values are well represented on the B.C. Hydro Board? If not, what could be done?

Ed John

I don't think there are any aboriginal people on the Hydro Board; but, I don't know if that's going to be the answer in any event. I think that the suggestions, in response to the earlier question and Dr. Henderson's answer, of involving communities and involving peoples is very serious and important. Listening to their concerns is probably a very good beginning for any group such as Hydro, B.C. Rail, or any other organization to take into account. I see in this province a big push by industry to deal with aboriginal issues, to deal with the whole question of the land in British Columbia and I think that our voices are beginning to be heard.

I have been following the Forest Resources Commission and I see, in the submissions by industry, momentum and support for resolving the aboriginal land question in this province in a fair and equitable manner. Similarly with B.C. Hydro, I think that it ought to learn from the mistakes of the past. I think those are days gone and I don't imagine that anyone will allow those atrocities of the past to happen again. I think that the question that I would have to ask is, "What is the process which would be fair to people for dealing with these issues, whether they are Site C, new reservoirs or whatever?"

The critical thing is, in addition to the excellent consultation process that B.C. Hydro is engaged in, that there is another step beyond that. That's reviewing the plans that are developed as a result of those consultation processes. There is not a public review of those plans and I think before those plans go any further, in addition to those consultation processes, there should be additional consultation processes by way of public review of those plans.

Moderator Bill Matson

Dr. Foster, this takes us back again to the nuclear question. "If half of Europe was affected by the nuclear accident at Chernobyl, could you please comment on your definition of 'remarkably safe'." Risk is a function of probability and social economic costs of the failure, and damage to half of Europe is not quite safe in the writer's opinion.

Dr. John Foster

Well I am not too sure what is meant by damage to half of Europe. There was a spread of radioactivity from Chernobyl which covered half of Europe and so I guess that was what was referred to. That was not a serious thing from the point of view of that half of Europe. It's not possible to say exactly what the effects are of a spread of radioactivity because we don't know the cumulative effects of such very low levels. Calculations can be made and they are based on a straight line relationship from high exposures down to zero. So the kind of thing we can say then is: "we can apply that same calculation to other radiation and say what the comparable effect is." In France, for instance, the additional radiation from Chernobyl had the same effect on the French people as the additional cosmic radiation they would have received if they had spent a week skiing at high altitude on Mount Blanc. So that's not a very serious effect on that particular country. There was a little more radiation in Sweden, with similar effects. However, why I was saying nuclear power is safe takes Chernobyl into account, or any other accidents that we know of. At Chernobyl there were 33 immediate deaths, about 300 hospitalized and then the radiation exposure of a large population at very low levels. We have some numbers of what the total release was. Taking that into account with all the other performance of nuclear powerplants and equating it on a dollar basis with other industries (because the dollar is a measure of the value of the service) we find it is a relatively safe industry. For instance with air travel, where in a plane crash 200 or 300 people might be lost, as they have upon occasion, and there is also the extra radiation exposure due to high-altitude flying; nuclear power compares very well. It's in the same league as air travel as a safe industry. That's ten times as safe as automobile travel for instance or, on a comparable dollar value, life in the home. In comparison with other industrial sectors it's, again in the safer category. It compares with the manufacturing industries as opposed to the extractive industries, for instance. So that was what was behind my remark about nuclear power having a good safety record so far.

Moderator Bill Matson

We have one more question for Mr. John. I remember that you are in a rush to catch a plane. "You indicated concern by the native people of our mismanagement of our energy sources. What end result can the native land claims make to this process? Do you see some form of integration and cooperation for the total benefit?"

Ed John

Well first of all, I'd like to comment on that air travel, seeing that I am going to be leaving fairly soon, I am kind of worried about that.

The end result of comprehensive land claims, in my view and I guess for the aboriginal land peoples in British Columbia, is that there is a question of the sharing of the resources, the sharing of the land base and an involvement by the aboriginal peoples in the management of the resources. You know what's done is done. There are probably avenues to deal with those by way of damages or some other legal mechanism; but, the important thing is to prevent these things in the future, so there should be ways and means to deal with them. Resource management, whether it's game, or water, or timber within our tribal territories, we feel that aboriginal peoples must have a decisive voice and some say in what happens to those resources within our communities. If it means setting up management boards or some other mechanism to deal with the use of the resource, that is what we are looking for.

I think in the end, what you will see is not a land grab by our people and certainly we can't grab our own land anyway; but, what we see is a real involvement by aboriginal peoples in the processes. Take a look at the Yukon and the Yukon agreement in principle, or what they call the "framework" agreement. It deals with water, it deals with the rivers, it deals with the impoundment of water and looking at the watersheds and water basins in the various areas in the Yukon. They've made plans and have built it into their agreement what mechanisms will be used when companies or utilities, such as Hydro, are considering putting in a dam for the development of hydroelectric power. I think that's probably, to me, the direction that should be looking in British Columbia. We look at James Bay as another example. The Cree and the Inuit in northern Quebec and how they were dealt with. They still have the second phase of those projects to contend with, but I think they have involved the aboriginal peoples in a very serious and meaningful way. With that I will have to leave you. Thank you all very much.

Moderator Bill Matson

We are going to continue just a few minutes into the scheduled lunch break and maybe go to about 12:10 if you are patient enough to sit for a few minutes more, because we have a lot of questions and I think they are all very timely and useful to discuss here. This one is directed to Hazel Henderson and Irving Fox, and you both might want to comment on it. The writer says, "I find it amazing that we keep talking about seemingly unqualified aid to the Third World after witnessing the failure of so many initiatives, e.g. the Kennedy's Alliance. If a package was put together it should be a partnership. What do you believe developed countries should offer and what should we demand or clearly expect in exchange?"

Hazel Henderson

I would just like to make an observation vis-a-vis nuclear power and the fact that I don't really think it has a future because there are a lot of studies comparing the full cost of nuclear electricity with other industries. This is a prime example of where the full social and environmental costs of nuclear were never factored in on the front end. It never would have been developed, in the first place, if we had actually cranked those numbers in or given some fair estimation of them, particularly the decommissioning costs. I think, apart from what happened with "WPPSS", which is well known to everybody, what happened to Mrs. Thatcher last summer. She was trying to privatize the electric utility industry in Britain. When they had to do the due diligence and prepare the prospectuses for the investors, what happened was, as you probably know, the British investors rejected the nukes and said this offering isn't going anywhere until the government took the nukes out of the offering. The investors were willing to buy the rest of the package, but the government got stuck with the "nukes". I just wanted to make that observation.

Now, this whole question of how we help the Third World is one that's on my plate all the time. In the past, all this one-way aid to the Third World was based on a Eurocentric view of the world, where development offices from the World Bank or Moscow University or the London School of Economics or Harvard University, went into these countries and said, "Well what you need is a steel mill and what you need is infrastructure and what you need is to develop your export markets in agriculture." We all know that that kind of aid was absolutely disastrous and they ended up with a mountain of debt, greater inequities between rich and poor and devastated ecosystems.

What I find is happening now at the World Bank, and I go talk to World Bank people who have a little cabal that meets at breakfast every month is they have a little meeting on "values in development" and I listen in on their conversations and they are realizing that they may have no competence whatsoever to understand what the development process is. They talk about such thing as "capillary lending" and the idea that they are trying to get that money down to the grass roots rather than giving it to governments for which they are catching hell from the right, or giving it to private lenders, private borrowers which gets them into trouble on environmental grounds from other people on the left end of the spectrum.

What I think is needed is this kind of debate about the new score card that I was talking about and I think that the first meeting of the G15 in Kuala Lumpur next month will be the kick-off in this whole debate about what will development look like when we have the new score card. In a sense, what I feel is going to happen is that we are going to realize that the errors of economic theory were to do with these excessive levels of aggregation with all of those wonderful algorithms, you know, about what kind of capital labour ratios were "correct" and what kind of investment profiles, and instead we are going to learn that we really have to go to these countries and first decode the cultural DNA pattern and find out what this culture is optimizing for.

What goals does this culture have? What menu of public and private goods and services are they even interested in? Do we have anything relevant to help them with it all? Now, what we can do? What I suggest to my Japanese friends, instead of these Marshal Plans, which are very good-hearted, is that maybe the best thing that they could do is go around, to the Third World countries that they want to make friends with; they have more Peace-Corps type volunteers in Africa for example, than we do from the U.S., and perhaps simply buy up their debt and retire it because we all know it is already in technical default. Really all the bankers are doing, in the Northern Hemisphere, is figuring out nice new words for it. You know, shall we call it renegotiation or shall we call it rescheduling? We all know that there has been a defacto default and that is the first necessary condition for a new path even though it's not sufficient. It's simply where we have to start.

Moderator Bill Matson

Irving, would you like to comment at all on what form aid might take to the Third World?

Irving Fox

Well I'm afraid I'm very poorly informed on this subject; but, it's one thing that has intrigued me a great deal and one of the things that has troubled me. I'd like to throw something out here, and that is, how do we get started? Is it appropriate to try to wait until we can get some massive international agreement that goes ahead on the kind of basis that Hazel has just been talking about? I wonder, and this is merely a question in my own mind, as to whether Canada, with its more modest resources, compared with what some other countries have, should narrow its focus to one or two countries and do the kind of analysis that Hazel has been referring to here, where first one tries to understand the culture and then from that tries to see how Canadian resources can contribute in these specific cases, and not try to cover very much of the world. If we could produce good examples, wouldn't we be making some progress? I guess that's the kind of question that's in my mind with regard to this problem.

Moderator Bill Matson

Just two more minutes. This is one that maybe I can comment on. "How can we get the same focus on energy efficiency that we currently have on the environment, for example all new plants have environmental impact statements? How can we get all new energy permits and also have an energy efficiency statement?"

I think that they recently issued new guidelines for our impact studies and any major projects in B.C. and someone from Energy, Mines and Petroleum Resources or Environment might want to comment on this; but, I'm sure that energy will be a key part of those statements and would be expected to be included. I'm sure the originators of those projects would cover that issue as well.

One last question. "Our class capitalistic economy is based on the premise that the ends will justify the means and the maximization of return on investment is a number one priority to pursue. How can environmental renewal and sustainable development be realized given the above?"

Dr. Henderson

This is the $64,000 question. Where the question has changed, from my point of view, is that we are now looking at also the failure of the socialist and communist models. What I was trying to suggest last night is that underlying those two models was the ideology of this numbers game. That we really could quantify all of these costs and benefits and then add them up and crank them into the decision-making in this very sort of narrow way. The whole problem is that model, that centralized mode, whether it's a mega-corporations or mega-governments trying to impose this industrial view on the world, is what is now on the agenda. That was the ideology underlying the industrial revolution, that this was the royal path to progress.

I think that we have to acknowledge all that we learned during the Industrial Revolution. Although it was quite a brilliant period in human history where we moved the furniture around and we tested all of the possible capabilities of what we could do with re-arranging matter. Now we have to take what we learned as we move into the information age and beyond and really rethink the whole thing and encourage all of the wisdom, from all of the cultures in the world, whether it's the 6000-year tradition in China, or from Lao Tsu, or whether it's a native American people, or whether it's the wisdom of the other half of all of the people on this planet and that is the women. There is going to be absolutely no way that the boys are going to be able to do by themselves. They are going to need the girls. We are waiting to help. So this time, it is going to be all of us together moving forward on what the new formula will be.

Moderator Bill Matson

On your behalf ladies and gentlemen, I would like to thank the panel for handling a lot of difficult questions in a very learned way. Now this time I'd like to hand it back to our Chairman who has some presentations for the panel. Would you please stay seated for a moment. Thank you.

Chris Boatman

Thank you very much ladies and gentlemen. I'd like to take this opportunity to thank Bill and the members of the panel. I think it's been an illuminating morning and I hope the rest of the program is up to this high standard. I am going to ask Larry Bell, our Chairman, if he would say a few words and make the presentations to our panelists.

Mr. Larry Bell

Well nothing more can be added to what was said of these particular gifts - their symbolism and their call for respect. I don't think we can improve on those words from last night. So Irving and John, I have these for you, similar gifts to the one Hazel got last night. Thanks John, very much and thank you, Irving.

QUESTIONS ANSWERED BY DR. HAZEL HENDERSON AFTER THE FORUM

Question

Do you see any hope for humanity's survival? (In anything like its present societies.)

Dr. Henderson

Well, the human species is certainly coming up to "Graduation Day" on this planet. We will either learn to change our values and behaviour to fit Nature's functioning or the Earth will continue its evolution without us.

Question

I have a Utopian Vision of an equilibrium society based upon the following four principles:

1. a stable human population;
2. a constant stock of material goods;
3. a minimum throughput of material resources (i.e. maximum recycling); and
4. a maximum proportion of our energy needs derived from renewable resources.

To what extent do you think this is reasonable and proper; and how long might it take?

Dr. Henderson

I find the four principles of your Utopian Vision very much in accordance with my own. I might just add that human creativity and knowledge are truly unlimited resources and we can all keep right on growing in wisdom, understanding and compassion, as well as in our enjoyment of the great creation of Nature. But I don't know how long it will take for us to get there.

Question

If we do agree on the answer to the question "What is valuable?", what are we going to use as a measuring stick? Won't we always be faced with measurement and management problems?

Dr. Henderson

I hope that we never all fully agree on what is valuable. The many different interpretations of what is valuable and important in life are what makes each culture unique. Hopefully, we can all learn to savour the diversity of each other's cultures, just as we do each other's art, food and music. The purpose of the "Country Futures Indicators" (trademark pending) that I am developing, is precisely that they will be crafted and operationalized around what each culture, region, city or village democratically decides is valuable. These new indicators will not be highly aggregated, swallowing up all the apples and oranges in one coefficient, such as money-denominated, per-capita GNP growth, but will instead, be "un-bundled" into all the many dimensions: from purchasing power parity, education, health, public services, to unpaid production, self-employment, energy/GDP ratios, military/civilian budget ratios, air and water quality, species loss and democratic participation rates. Each country will have a different "spin" on the importance of all these factors, as well as others that are quite unique or country-specific, rather than country-comparable.

Question

How can developed countries encourage population control in Third World countries when they are exporting machinery, consumer goods, etc., which drives the Third World even deeper into debt?

Dr. Henderson

They can't, with any real credibility. This is one of the new global issues of the 1990s. We might call it "green geo-politics". The upcoming conferences in Bergen, Norway and Brazil 1992 will begin the hard global bargaining and negotiating that must resolve these issues. My hope is that the Northern Hemisphere industrial countries will realize that they must take the first steps, and show good faith by reducing their per-capita consumption of energy and raw materials --- since so many of their problems relate to over-consumption and inequitable sharing within their societies.

QUESTIONS FOR JOHN FOSTER ANSWERED AFTER THE FORUM

Question

Could you comment on what you see as an appropriate technology for a developing country to use in providing for their electrical energy needs?

John Foster

There is a great variety among the developing countries and, indeed, within most of them. As a result practically all technologies are appropriate somewhere in those countries. For instance, hydro-electricity is available in a great many of the countries and has been used for many years. Bolivia, Ghana, and Bangladesh are random examples. Other countries have coal. China, of course, is a prime example but India, Namibia and Colombia among others have large coal resources which can be and are being used for power production. Some countries, like the Arab countries, have oil and gas; and Mexico and Indonesia, have a relative abundance of all fossil fuels. In a few countries, like India, segments of the society are very highly developed so even the newest technologies, such as nuclear power, are available to them. In other areas, though, agricultural wastes such as bagasse may be all that is available. Other energy sources, not so readily or economically convertible to electricity, can provide substitutes. For instance, gas from the anaerobic digestion of human and animal wastes is used for cooking and some lighting in some countries. The government of China has built about five million of these units for villages and households.

Appropriate technologies are those for which the necessary resources, competence and capital are available. We might also add "and that do not pollute the environment". The developing countries, however, can't always afford the latter. They can only afford what will provide the most energy that is within their means.

Question

Considering the decertification and even the decommissioning of some U.S.A. nuclear powerplants; why do you think Canada has not gone through the same re-appraisal?

John Foster

In Canada, three nuclear powerplants have been decommissioned: NPD the original 20 MW prototype after operating successfully and providing valuable training and information for 25 years; Douglas Point the 200 MW commercial prototype of the same type after 17 years providing information, training and energy; the Gentilly an experimental 250 MW variant after a few years. However, none of the commercial powerplants have been retired from service.

As the questioner indicates, in the United States the situation is different: in addition to prototype plants, the construction of several commercial nuclear powerplants has been suspended and some decommissioned. Overcommitments for major plants of all kinds because of the downturn in demand a dozen years ago, regulatory and other delays in projects and some large cost overruns induced utilities to cut back on some of the worst affected projects. These experiences and Public Utility Board disallowance of the extra costs in rate setting has made

American utilities, to use their term, "risk averse". They are looking to others to balance supply and demand in their service areas. Central Maine Power expresses it with the slogan "Conservation, Cogeneration and Canada". In the nuclear field this "risk averseness" is exacerbated by the experience of Three Mile Island, which, although it didn't injure anyone, cost at least two or three billion dollars and didn't do anything to further public acceptance of nuclear power. In Canada there were overcommitments, delays, cost overruns, and expensive equipment failures, too, but they were all less extreme than in the U.S. so that, although encouraging conservation and cogeneration, Canadian utilities are still prepared to make major investments, including in nuclear power, where these are appropriate; and there is less negative public reaction. There are other differences which have a bearing on the different attitudes in the two countries. Canadian utilities are more robust than many of the utilities in the United States. In addition, only a few in this country are subject to the vagaries of the stock market.

Question

What is your prediction respecting nuclear power as a major source of energy in North America and in other parts of the world?

John Foster

The world has two basic sources of energy: the sun and the energy bound up in the nuclei of atoms, produced in an earlier sun, which exploded to provide some of the gases which make up our sun and the outer plants and the dust which makes up the inner planets including the earth.

Solar energy (from our present sun) provides, immediately or in a season or so, all the essential energy for basic living: a habitable - indeed often very pleasant - environment and food. It has also provided, through plants and animal wastes and, through wind and waterpower, energy for our forefathers as early as the eighteenth century. Through the fossil fuels, ancient solar energy still provides most of the conveniences in local climate control, transportation, illumination and communication of this century. Ninety percent of the controlled energy in a modern industrialized society comes from this ancient sunshine. There is, however, only three weeks worth of the world's ration of sunshine stored in these fuels. It appears that our use of these fossil fuels will peak within the next century; but our need for energy will probably remain, at least, at present levels. Ten billion people using only ten percent as much energy as we use today in Canada would require as much energy as the world now uses. If fossil fuels can no longer provide it, it will have to come from more exploitation of solar energy (and its new derivatives such as plants) and/or from nuclear energy. I have no doubt that it will come from both with a very large fraction from nuclear energy, simply because nuclear energy can be safe, very clean and economic for certain purposes such as electricity supply. With respect to the long term - after 2050 - there isn't any question in my mind that nuclear power will be a major source of world energy.

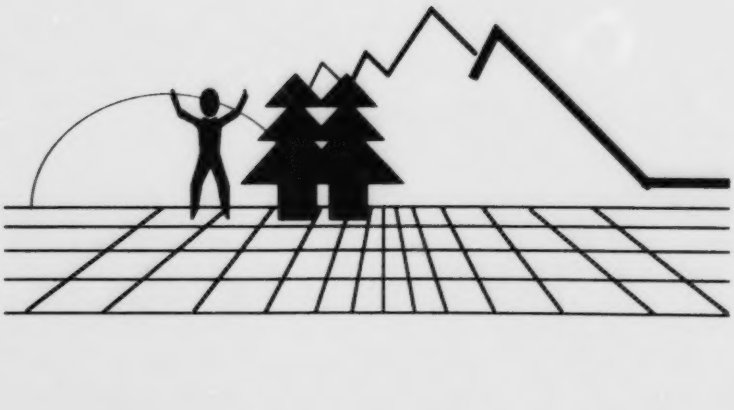
What about the next few decades? This depends very much on availability of alternative fuels at reasonable cost, attitudes toward release of materials into the biosphere - (necessary with alternatives, essentially unnecessary with nuclear power) - and attitudes toward nuclear power, itself. My expectation is that France will continue to use it for much of the increases in electricity production. So will Ontario and perhaps New Brunswick in this country. So will Japan and India to name a couple of other countries. Within 20 years there will probably be a new wave of nuclear power installations, in several countries including, in particular, the U.S., spurred by uncertainty about fossil fuel supply and prices - (not because of any intrinsic problems, on a world basis, at that stage but because of the cyclical and emotional nature of human behaviour).

THIRD ANNUAL

ELECTRIC ENERGY

FORUM

Lifestyles, the Environment and Electricity Use



LUNCHEON ADDRESS

Introduction of Richard Dalon

Philip Carter
Director, Electricity Policy Branch
Ministry of Energy, Mines and Petroleum Resources

Introduction of Richard Dalon by Philip Carter

Before I introduce Richard Dalon, who is our lunchtime speaker, I'd like to say that the Ministry is extremely pleased to be a co-sponsor of this event. First of all, the quality of the environment and the lifestyle that citizens of British Columbia enjoy - and I need convince no one in this room how important it is to maintain and preserve that environment. I've also been impressed with a degree to which B.C. Hydro is doing public consultation as an important part of the electricity supply planning process in British Columbia. I believe this Forum is an important part of the overall public consultation process which B.C. Hydro has introduced and will expand in the future.

Richard Dalon is Deputy Minister of B.C. Ministry of Environment. The Ministry is responsible for planning, policy management and public education on environmental matters. Mr. Dalon is also Chair of the Deputy Minister's Management Committee for the Canadian Council of Ministers of Environment, Co-Chair of B.C. Deputy Minister's Committee on Sustainable Development, Co-chair of the B.C. Western States Task Force on Oil Spills, and a Member of other Committees on the Environment and the Economy. Before joining the B.C. Government, Mr. Dalon served in the Federal Department of Indian and Northern Affairs, and in various positions with the Government of Alberta. Ladies and gentlemen, speaking on behalf of The Honourable John Reynolds, Minister of Environment, please join me in welcoming Richard Dalon who will speak to us concerning B.C.'s Environmental Strategy for the 1990s.

Luncheon Address

B.C.'s Environmental Strategy for the 1990s

Richard Dalon
Deputy Minister
Ministry of Environment

Thank you very much ladies and gentlemen. It is a great pleasure for me to participate in the Third Annual Electric Energy Forum today. I would like to bring greetings from The Honourable John Reynolds, Minister of Environment, who unfortunately is not able to be here today.

My topic is "B.C.'s Environmental Strategy for the 1990s". If I attempted to cover all the issues implied by these words, we'd be here a long time after the coffee was all gone. Instead, I'd like to give you an overview of where we stand, from the perspective of the Ministry of Environment, and where I believe we have to go in the next few years, with specific reference to electrical energy use as one facet of social and economic behaviour. It's truly encouraging to see how people of goodwill all around the world have embraced an idea as all-encompassing as environmental protection and resource conservation. The people of the world, and especially here in B.C., are getting connected to the idea of environmental protection. Some believe that this height of concern for the environment will disappear with the next economic recession. I do not share this belief.

It is my view that we are on the threshold of an entirely new way of doing business. What we are seeing is a fundamental shift in social values. A new moral imperative has emerged, and society no longer tolerates environmental degradation. Most of the issues facing government and public policymakers today, by the way, are issues which are not scientific and technical issues but rather are ethical issues. And so the new dilemma and new concern for governments and for public policy, I think, is how to come to terms with these ethical issues rather than the very narrow and specific technological or scientific issues.

While the concept of sustainable development has had a relatively short history, its momentum is undeniable. British Columbia has been witness to this phenomenon as much as anywhere else. In the Fall of 1988 the government took up the challenge of sustainable development and appointed a task force on environment and the economy. The task force was chaired by Dr. David Strangway, the President of the University of British Columbia, and included representatives from business, labour, environmental organizations, and native groups. As Deputy Minister of Environment, I had the honour, along with Bob Plecas, the Deputy Minister of Regional and Economic Development, of serving on this important task force. The response to the task force was overwhelming. We received hundreds of briefs from all sectors of society, reflecting widely differing viewpoints.

Some common principles emerged on what sustainable development means to British Columbians. First, environment and economic issues are interdependent and must be integrated at the local level. Second, ecological integrity must be preserved. Third, consideration must be given to non-economic values or economic values in a very broad sense, as Dr. Henderson spoke about last evening in her excellent speech. Fourth, sustainable development is a constant process of change. Let me pause just for a second on this. I can't resist putting on my other hat for a moment. My background is in philosophy, and I go to many conferences where people are talking about the definition of sustainable development. Everyone is saying we don't know what sustainable development means, and we spend agonizing hours and days scratching our heads, and we all go away saying we don't have a definition.

I think myself that the concept of sustainable development is what in philosophy is called an open concept. We want to make a distinction between an open concept and a closed concept. A closed concept is one where you know the necessary and sufficient conditions under which you are prepared to call something an X. For example, a vixen is a female fox. Every time we see a vixen or a female fox we know it's a female fox. There are no borderline cases. This, however, isn't the way most of our concepts are defined. Take two examples that philosophers like to talk about. One was named Gloster Glickenstein and he talked about defining games and art. If I asked everyone in this room to give me a definition of art I would be very surprised if all of us could agree on a definition, and in fact many of us probably couldn't come up with one at all. And yet we think what follows from that is we don't understand how to use the term "art", which is obviously false.

If I took, for example, a hundred objects and put them in the room next door, some of which were art objects and some of which were not, and I asked everyone in this room to go over and pick out the art objects, I would bet we would have a 99 percent success rate in picking out the art objects. And yet again if I asked you to give me a definition of what art is, you couldn't do it.

But what it means is that we recognize what he called "family resemblance". So if you look at art, you take an object that you see, and if some other object that someone else is going to call "art" resembles in some way or has enough of the characteristics of that particular object, then we agree that it's art. There will always be borderline cases where you are not sure, but that allows the concept to expand. On the other hand, when you have a closed definition you can never expand it.

So I argue that people do know what sustainable development is. You can get almost every person to look at a given situation and tell intuitively whether or not it is a sustainable development project, even though they may or may not be able to actually define it in that very narrow sense of "closed concept".

Finally, the principle of sustainable development requires that local communities must participate in decision-making. this is all-important, as I think Dr. Henderson pointed out last night.

In June of 1989 we released our task force report entitled "Sustaining the Living Land" which laid out a comprehensive game plan aimed at achieving sustainability. A key recommendation was the establishment of a British Columbia Round Table on the Environment and Economy. This Round Table is now in place, and has started its important deliberations. The first task it has undertaken is developing a sustainable development strategy for British Columbia. In addition, we are also examining new mechanisms to resolve natural resource conflicts, to involve the public in decision-making, and to promote public education and dialogue.

The stage is now set for change. I would now like to share with you how we are attempting to reshape our Ministry's focus for the 1990s to incorporate sustainable development into everything we do. First of all, we have prepared a new statement of Mission, Goals and Objectives within the context of sustainable development. Our new Mission Statement is this:

> "To encourage sustainable development, curb environmental degradation, and ensure that environmental management can meet the changing needs and priorities of the many users of the resources."

In carrying out this mission, we will play three roles: leader, guardian and steward. This statement of our basic intent as a ministry has been widely circulated for review and comment, and forms the basis of our activities into the next decade.

One of our major initiatives resulted from a directive of Cabinet to develop a vision and a comprehensive British Columbia action plan, which we have tentatively titled, "Environment 2001". In the process of developing this document, we have called upon our colleagues and all of the other Ministries to assist us in defining the environmental challenges which confront us. This document will consist of three sections: a review of the environmental issues and challenges, an analysis of the relative risks that each of those challenges implies, and a ten-year corporate plan for government action. It will then be our Ministry's intent to seek the necessary legislative authority and budget to implement this action plan.

Perhaps I can give you a better idea of where we are headed if I speak for a few moments on some of the specific program areas of our Ministry. As many of you know, the British Columbia Ministry of Environment has responsibility for the fish, wildlife, air, water, waste, and pesticide programs of government.

In our pesticide program, for example we are attempting to redefine our responsibilities. Traditionally, we have focused our interest on ensuring that chemical pesticides are used and regulated according to established guidelines. We are now attempting to redefine this program in the context of sustainability. Simply put, our new mission statement for this program will focus on our responsibility to ensure that pests are managed to protect human health and safety and the natural environment, while minimizing the use of chemical pesticides. This would include methods of controlling pests without using any chemical means at all.

We are also attempting to redefine our water management program in keeping with sustainable development principles. Within the next few months we will issue a discussion paper on water resources. In our early examination of this important program area it is clear that we must redirect our focus away from allocation and concentrate on water quality. Among the basic elements of the sustainable water resource policy are: water must not be allocated beyond the resource's capacity to replenish itself; greater emphasis must be placed on protection of the quality of water, rather than simply its allocation; water resource management should consider both instream and out-of-stream uses. Water resource planning must be anticipatory and integrative in nature. Finally, users must pay a higher proportion of costs for utilizing this precious resource.

Other important areas where we are challenging our basic assumptions are solid wastes and hazardous wastes. Specifically, in the area of waste management, our traditional orientation was through control strategies via permit. We are now looking at dramatically shifting our focus towards reduction and recycling. We see our new role in this area as reducing waste quantities; not facilitating increased volumes.

Hazardous waste management is another area where we are attempting to redefine our program orientation. With an estimated 450,000 tons of hazardous waste already in storage and about 100,000 tons produced each year, finding a long-term solution is imperative. Here again, our major focus is in the front end of the issue. We are concentrating our hazardous waste program on reduction and reprocessing instead of just concerning ourselves with ultimate disposal. In this regard we are organizing a hazardous waste corporation to deal with all facets of this issue.

In our Ministry's quest for sustainable development we are also examining our existing legislative base. Our Ministry is conducting a comprehensive review of all of our various acts and regulations to ensure that they contribute to sustainable development. As part of this legislative review, we are also questioning some of the initial assumptions upon which the legislation was formulated. This is critical if we are to equip our legislation to meet the challenges of the 1990s.

A rigorous enforcement policy is also paramount to achieving sustainable development. Our Ministry has strengthened its enforcement capability significantly in the last two years, and this focus will continue.

In addition to a strong enforcement campaign, we are also examining new and creative ways to facilitate environmental protection through economic incentives. Sustainable development will move closer to reality if we can financially reward those corporate and municipal entities that are progressive.

In addition to re-examining our program areas to ensure that they promote sustainability, it is fundamental that we look at the human dimension. If we are to be successful in our goal of facilitating sustainable development in British Columbia, it is essential that we encourage our ministry staff to re-examine everything they do. We must ensure all of our initiatives, encourage and facilitate sustainable development. This process of re-evaluation by staff must also be an on-going effort as we refocus for the 1990s.

What does this mean to the future of hydroelectricity development and electricity use in this province? Clearly it means electricity will be weighed against competing demands on the water resource, many of which have not always had a prominent place in conventional planning and resource development. I am thinking here of water quality and the values associated with fisheries, wildlife, recreation and tourism - to name just a few of the competing demands. There will also be increasing public pressure to examine the full impact of each new proposal for electricity generation and to consider alternatives. We have to make it clear to individual British Columbians that their everyday decisions have wide-ranging implications for our environment. Each new personal electric appliance as simple as a hair dryer places a new demand on the supply of electricity. It comes down to re-evaluating our individual lifestyles.

There is an urgency to this. For example, British Columbia's population is growing. Last year we experienced a net gain of 60,000 people. This growth trend has direct implications on the supply of electricity. Fortunately, conservation measures such as Hydro's Power Smart program have already saved enough energy to supply electricity to five thousand homes. But obviously more must be done to meet the demands for future and to moderate them where possible. Let's not underestimate the value of conservation.

Let me cite just one example,in the area of hazardous waste control, that has a bearing on energy conservation as well. I read recently that some Canadian film processing labs (maybe where your family takes their snap shots) have reduced their chemical buying 90 percent through recycling. I also heard an interesting story on the radio the other day which I found very exciting. A company had a creative way to do their packaging. Apparently they were using small styrofoam chips, and customers were telephoning to complain that these little chips were not biodegradable and damaging to the environment. Some of the senior staff thought about this for awhile. They asked each other the question: "what does this styrofoam packing remind us of?" Somebody must have said "popcorn". Eureka! - why not box this in popcorn? Apparently, they bought huge popcorn makers and began to pop popcorn in their company and use it to pack all of their equipment. The customers were so thrilled they wrote back to the company and said, "this is wonderful - I can eat this stuff, or I can throw it out to the birds. It also had another side affect: the people in the factory actually enjoyed coming to work - they thought they were going to the movies instead.

Small decisions, choices such as this, have many spin-offs. The provincial budget, introduced this spring, established the permanent Sustainable Environment Fund, which in itself is evidence of a commitment to the new moral imperative. Perhaps more interesting than the fund itself are the new policies aimed at individuals, policies that make the connection between our personal decisions, our choices as consumers and their environmental implications.

There will be a three-dollar disposal levied on the purchase of each new vehicle tire. This will help pay for disposal, but more importantly, it makes the connection. The levy is a reminder to the consumer, at the point of sale, that old tires just don't fade away. Somewhere, someone has to dispose of them or recycle them in a responsible way. If the levy encourages motorists to put fewer miles on their tires, take the bus more often, then we will have achieved something.

What is the electricity connection? If tires are treated as a more valuable commodity, motorists will use them more efficiently. They will last longer and there will be less energy used to produce new ones. There will also be a $5 disposal levy on the purchase of lead acid marine and automotive batteries. Again the intention is to make the connection between the consumer product and the environmental implications. The new levies are more important as vehicles for public education than they are as revenue generators for government. People have been talking about conservation for many years. Great gains have been made, but I believe the potential gains from conservation over the next ten or 25 years will be much greater.

Let's look at a best-case scenario for hydroelectricity, for example. Perhaps with serious conservation efforts, our existing inventory of hydroelectric dams will be adequate for the foreseeable future. There is a vast untapped resource in the new more efficient household appliances, in increased consumer willingness to throw away less and recycle more, and in the introduction of alternate electricity generating systems.

One environmental group, Friends of the Earth, as quoted in the Canadian Green Consumer Guide, estimates that Canada could be getting more than 80 percent of its energy from renewable sources, primarily solar, by the year 2025. Conserve and diversify - good advice anywhere, in business, boardrooms and for the environment.

In the years after the Second World War, as our houses filled with stereos, saunas, hot tubs, dishwashers, and electric garage door openers, hydroelectric dams were springing up at phenomenal rates.

In the years between 1951 and 1981, the number of hydroelectric dams in Canada increased from 203 to 576. At the same time their storage capacities, their reservoirs, grew nearly ten-fold. That sort of expansion was never questioned in the context of the 1960s. Consumers back then weren't tuned into the fact that as they plugged in their inefficient appliances, the dams were rising.

Today, the attitude is very different. I believe it will be a major responsibility of my ministry in the years ahead to help provide detailed information on how to conserve and protect. Your participation in this Forum is evidence that you, as individuals, and as representatives of your organizations, understand the dimension of the environmental challenges facing British Columbia.

I repeat that we are all on a threshold. Consider how recent widespread electrification really is. Barely 100 years ago, not much more than a human lifetime, few homes in Canada had electric power. A crude form of direct-current hydroelectricity, was introduced on a very limited scale in the 1880s. It wasn't until 1896 that a breakthrough was made in alternating current technology, allowing hydroelectricity transmission over the vast distance of 32 km, from Niagara Falls to Buffalo, New York. The point is that we are still pioneering in hydroelectric development.

I look forward to the balance of this Forum as an important vehicle for phrasing some of the new questions and developing pioneering environmental answers. Thank you for your attention.

Chris Boatman

Richard has agreed to give us five minutes to answer some questions so we'll take a few questions from the floor.

Question

How are you going to get other ministries of government to cooperate with the Environment Ministry's "Environment 2001" initiative?

Richard Dalon

I think all of the other provincial ministries have recognized the importance of the environment. I am getting a lot of cooperation from my colleagues. The new generation has already accepted the environmental challenge. So I am getting a lot of support. Each deputy minister has to work within his own ministry to alter the patterns of the past, the way things were done in the past. I believe that we can see this now in the Ministry of Forests. They are changing their views on the forest. My colleague, the Deputy Minister of Energy, Mines and Petroleum Resources, Doug Horswill, is also making changes within his ministry. And we are all working much more closely together than we were in the past. So I see a great deal of cooperation among all of the ministries. By the way, regarding "Environment 2001", it's very important to understand that that is not just a program developed for the Ministry of Environment. It will represent the government of British Columbia, and therefore all of the ministries. So we will all have to compromise to ensure there's consistency between our own ministry's views and those of other ministries.

Question

What will the effect of your new directions in the Environment Ministry be on the Wildlife Branch? Will it receive a greater share of the Ministry's attention?

Richard Dalon

In the past, it is fair to say that the emphasis of the Wildlife Branch was probably directed at the large ungulates such as elk and moose; for obvious reasons, they are the traditional hunting resource. We are going to be directing more of our attention to maintaining the habitat of other animals that live on the floor of the forest. More of our money will go to doing inventories of those animals and their forest habitat. Last year, it was fair to say our ministry emphasis was on controlling waste. We had a lot of problems, and still have a lot of problems, but this year we are going to redirect some of our effort, and our new emphasis is going to be on integrated resource management. If there is no habitat, there won't be any animals. So a lot of our staff and a lot of our money will go toward developing habitat and integrating our relationships with forest companies, with our forestry ministry, with Energy, Mines and Petroleum Resources, and so on.

Question

Where will the revenue from your "green" taxes on new tires and batteries be spent? Who gets the money?

Richard Dalon

All of the revenue from the levies on tires, diapers, and batteries, as well as fines that are generated, will go into the Sustainable Environment Fund. It will not go into general revenue. So these funds will be earmarked and directed to environmental work. The fund will be managed by the Cabinet Committee on Sustainable Development. Within our ministry, we are now developing programs to ensure that there are going to be recycling capabilities to deal with tires and to deal with batteries. We are going to use that money to encourage the private sector to develop innovative ways to accomplish this.

Question

Aren't car batteries being recycled already?

Richard Dalon

No, a lot of the batteries now end up in landfills and other inappropriate places. They aren't recycled.

Question

Why don't we collect a deposit on all glass containers, not just pop cans and bottles and beer cans and bottles? Alberta recycles wine and liquor bottles. Why don't we?

Richard Dalon

Well, the trouble is, sometimes you can sell these things for a dollar to a dealer, and then they simply turn around and put them in the landfill. So all you've done is to set up a collection system - if they still end up in landfills, it really hasn't solved the problem. What we are trying to do within our ministry is to develop a solid waste management program which will encourage the private sector to ensure we can either recycle these hard-to-manage products or find some other acceptable way of dealing with them.

Chris Boatman

Sorry Richard, I have to cut it off because of time. We've had a very heavy morning and we face a busy afternoon.

Thanks to Richard Dalon by Chris Boatman

I'd like personally, on behalf of the group, to thank you very much for an intriguing speech. I am sure you will get a lot more questions if we don't let you out of here. So thank you again, Richard. We'll see you all at 2 p.m. This session is adjourned.

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ELECTRIC ENERGY

FORUM

Lifestyles, the Environment and Electricity Use

FUTURE ELECTRICITY USE AND ITS IMPACT ON THE ENVIRONMENT

Sustainable Development, Public Values and Electrical Energy Choices

Introduction of Dr. Tim McDaniels

Chris Boatman
Conference Chairman
B.C. Hydro

Introduction of Dr. Tim McDaniels by Chris Boatman

Good afternoon ladies and gentlemen. I'd like to call the afternoon session to order.

This afternoon we have a session devoted to Future Electricity Use and Its Impact on the Environment. We have a number of speakers that will lead us through this. In the middle of the afternoon we are going to take a break and show you the results of Schools Program that we asked schools in the Prince George area to take part in. I was fortunate enough to be in Prince George the day of the judging. I didn't manage to see the eventual winner but I saw or five of the schools competing and I can tell you it was very illuminating. I think you will find that a very interesting break in the middle of the afternoon.

I'd like to move to our first speaker this afternoon who is going to talk to us about sustainable development. Dr. Tim McDaniels of McDaniels Research Ltd. is President of McDaniels Research Ltd. and a visiting professor of environmental studies at Western Washington University. He holds degrees in Economics and Decision Sciences with Emphasis on Risk Management, and has taught at three universities. He specializes in developing decision-making methods for use in analyzing environmental problems with government and industry and has published widely on this subject. Please welcome Dr. Tim McDaniels.

Sustainable Development, Public Values and Electrical Energy Choices

Dr. Tim McDaniels
President
McDaniels Research Limited

Thank you very much. I am delighted to be here this afternoon for a number of reasons. First of all I feel quite honoured to be invited to speak to this Forum and share the speaking duties with the very interesting and passionate people who've we heard speak so far.

The second reason I am delighted because I get to speak to you about three things that are of great interest to me - sustainable development, public values and electric energy choices, which is the title of my talk. (See Exhibit 5-1.)

I'll give you a brief outline of my talk so you will have a sort of notion of where I'm going. I'd like to start by introducing the idea of environmental problems as decision problems and I'll talk about what that means. (See Exhibit 5-2.)

Secondly I will discuss some of the concepts of sustainable development. I must say, following Richard Dalon's excellent talk at lunch is a bit difficult, but I'll do my best. I'll try to speak in more concrete terms about sustainable development choices. One specific example I will be talking about is chemo-thermal mechanical pulp mill development in British Columbia which I will just refer to as TMP mills. In conclusion I will turn to a discussion on trying to make better decisions as an approach to environmental tradeoffs.

I like to tell my students, when I get an opportunity to speak like this, that environmental problems aren't technology problems, they aren't biology problems, they are decision problems. (See Exhibit 5-3.) That is, choices made by individuals, organizations in governments are really the factors that determine the environmental outcomes we see around us. Decisions made on an ongoing basis at all these levels are what have brought us to the environmental circumstances that we find in this province and all over the world. These groups face decisions with choices over alternatives. We have to make choices regarding how we are going to proceed, in terms of a specific investment, in terms of a consumer purchase, in terms of government policies, and so forth. And one way to think about how to move things in the right direction, in terms of the environment, would be to cast these issues in terms of making better decisions. I would define "better decisions" as those decisions that use logic and the information that we have to make choices that have the best chance of giving us what we want. The idea of the best chance recognizes that there are uncertainties in all decisions that we make, particularly in the environment and we have to try and do the best we can to make decisions more robust in view of these uncertainties.

Not only are environmental problems decision problems, they are probably the toughest decisions that we as a society face. (See Exhibit 5-4.) I will explain exactly what I mean by that. First of all, as we all know, environmental problems are situations that involve deeply held and quite conflicting values between different groups in society. Look at the issue of preserving old growth forest which is a major problem in the Pacific Northwest of the United States, and becoming a controversial issue in this province as well. On one hand we have groups who feel as strongly about old growth forests as they do about religion, freedom or their families. And on the other hand we have groups that believe their livelihood and way of life is being taken away. These are very deeply held and conflicting views. A second problem in terms of these decisions is that there are enormous scientific uncertainties about environmental systems in general. Either we don't know very much about environmental systems, or those that we do happen to know something about are inherently unpredictable in any case.

A third aspect of these problems is that they are multi-disciplinary. Building a reservoir for example, would involve many different areas of expertise. And there are no overall experts that we can turn to to tell us the right answer. Another very complicated aspect of environmental decisions is the incentive structure. I will just give you a quick example that will point out the importance of incentives (the way we price things, the way we value things) and how they affect environmental problems. We as North Americans, counting America and Canada together, probably spend hundreds of millions of dollars every year investing in ways to develop new genetic information. The reason we do that is because we can use this genetic information to produce marketable products. At the same time, we are losing up to 100 species a day, according to some experts, on a global basis, of natural genetic information among existing species. The reason that this happens is because there are no incentives to try and conserve these species. In fact we have incentives to do just the opposite. A third issue that makes environmental problems really tough is the existing institutional structure. Institutions are inherently slow to change over time and we are asking for major shifts in how corporations and governments respond to environmental values of different groups in society. Another point is that these decisions have very long time horizons and obviously they involve high stakes. So I would say they are the toughest decisions that we have to make as a society.

Sustainable development is a topic we heard about at lunch time, and we have heard a lot about it in the last few years. I would like to talk about what sustainable development has to say about environmental decisions. (See Exhibit 5-5.) In very brief terms, one of the precepts of sustainable development is that we can no longer view the environment as an interesting backdrop and storehouse of raw materials against which we undertake economic activity. A precept of sustainable development would be that we have to take careful account of the environmental implications of economic activities. Now that is easy to say but in practice what that means is marrying two very different perspectives. One is a short-term perspective that involves the interest of specific groups (that's the economic perspective) and the other is a long-term perspective that involves the interests of society and the environment at large. And fitting those two things together, in terms of applied decisions, is no easy task.

A second concept to sustainable development would be that the current generation should not undertake activities when meeting the needs of the current generation, that will compromise the ability of future generations to meet their needs.

A third point would be that, in general, we have to try and reduce both the energy inputs and the resource inputs in all economic activity that we take. We have to be much more efficient.

A final point that I have drawn from the sustainable literature is simply that decisions are very closely related and we have to pay attention to how they fit together. I will be talking about that a bit later. Now I think these are very powerful concepts that have enriched the public debate enormously about environment and economy relationships. The question I would ask, and that I will be trying to talk about here is, does this give us a specific prescription, in the sense of telling us what to do next? Does it give us a list of what tradeoffs we are prepared to make?

One attempt that some writers have offered at providing an operational definition of sustainable development would be the following concept. If we are going to maintain the ability of future generations to meet their needs then we shouldn't have any reduction in our environmental capital. (See Exhibit 5-6.) That is, ideally we should use only the "interest" off our environmental capital. Now we have a fairly clear idea, I think, of economic capital, but it's interesting to think about the store of natural resources that we are provided with as environmental capital that we have to use wisely and not consume the principal. If you think about it, all of those who happen to live in this province are extremely wealthy in terms of environmental capital. The issue is how we are going to conserve it and use it over time.

With that background on environmental decisions and sustainable development, I'd like to briefly talk about the future of TMP mill development in British Columbia. (See Exhibit 5-7.) TMP is a new pulping technology that has many interesting characteristics that make it appealing. First of all, it's worth pointing out that the province has recently entered into a number of new pulpwood harvesting agreements that set up opportunities for firms to conceivably construct new mills in the future that would use material that is currently not utilized by the forest industry and harvest species that are not now utilized to a great degree by the forest industry. In that sense TMP mills are very appealing. They could use material that we now treat as waste. Another desirable aspect of TMP mills is that they have different environmental outputs, different effluent streams that some people would say are more desirable, because they do not involve dioxin emissions.

A third point about TMP mills that is very appealing is that they get about twice the amount of pulp output for a ton of raw material input as does a kraft mill. In other words, they are extraordinarily efficient in how they use the fibre.

So on the face of it all these three things seem very desirable. The drawback is this: TMP mills use about twice the electrical energy, and about five times the purchased electrical energy than a kraft pulp mill; that is a dramatic difference. Probably the single biggest factor affecting when we may need new generation facilities in this province is when and how many new TMP mills get built. It has a dramatic effect on the rate of electric load growth in the province.

Now the question I put to myself, and I put to B.C. Hydro and to you is, is it sustainable development to build a number of new TMP mills in the province? Certainly it is sustainable in the sense that the forest industry provides a flow of resources over time and hydroelectric projects provide a flow of electrical energy over time. It's also the case that we don't have an infinite supply of unutilized rivers in this province and all energy developments that we undertake for industrial purposes do affect how we can use energy for other purposes.

I would argue that tradeoffs between environmental capital and economic capital are virtually inevitable as we have population increases or as we have income increases, or both, unless we become super-efficient in using the environmental capital that we have now. (See Exhibit 5-8.) Given the views on population increases and, in general, the attempts to try and increase income (if not per capita then broadly in this province), I think it's fair to say that in tradeoffs between environmental capital and economic activity have got to occur over time. That is to say, if we had five new pulp mills developed in this province it will change what environmental resources subsequent generations have, and it will also change the economic resources they have as well. But it's not straightforward what those tradeoffs should be and what sustainable development has to say about the desirable tradeoffs.

I would say that sustainable development is an enormously important concept that has brought to public debate deep questions about our society. (See Exhibit 5-9.) I have to say I don't believe that it is prescription on exactly what to do next. I feel that we can't escape tradeoffs about environmental resources and economic activity. Finally I also think that a lot of the writing and thinking about sustainable development can greatly inform how we approach these decisions in coming years, particularly in terms of the context of the decisions, what we are comparing, the tradeoffs, what values we feel are appropriate in judging these decisions. Finally, I think an interesting issue is the role of science in this whole business.

Turning again to TMP mills, let's think about forestry and electrical energy development in this province. (See Exhibit 5-10.) An important issue in terms of viewing the idea of forestry development is to view this as a hierarchy of decisions. How should we utilize unallocated wood waste in this province? And I think that if we view forestry issues as we have historically viewed them that would be the right question. We have unallocated wood, how should we use it? I think a higher order of question than that is what kind of resource development do we think is appropriate and desirable in this province? And an even higher order question than that is what kind of province do we want? Those of you who happened to see the "Scientific American" special issue on Global Change in September 1989 would see discussion of asking deep questions about what kind of planet do we want and what kind we can get! Thus, one important part of context is asking the right questions.

We have the same kind of hierarchy in electrical energy decisions. (See Exhibit 5-11.) The lowest level decision that's been asked in the past by electrical planners is how should we supply the next increments in power. Should we have a hydroelectrical development, a coal-fired powerplant, or a nuclear plant? I think that a higher order question than that is how much power we need and how we should use it. Again, the highest order question is what kind of province do we want. I think it's interesting that organizations like Bonneville Power and B.C. Hydro are probably leaders in asking the higher order questions of how much power is needed and how do we want to use it. In part, that's because of their semi-public nature. As public organizations I think they have more latitude to ask these higher-order questions.

The point I would like to make about this hierarchy of questions is that integrated decisions are needed on new pulp mill developments and the extent of electrical energy development in this province. (See Exhibit 5-12.) My personal view is that these decisions should not be taken piecemeal. In other words, those who advocate and plan new pulp mill development in the province should understand the electrical implications. Four or five new pulp mills might mean a number of new generating facilities that would not otherwise be needed nearly as soon. And, as I say, the number of new mills has major implications for generation requirements.

Another key point is that value judgements are a key component of these decisions. (See Exhibit 5-13.) It's very important in any kind of public policy process to distinguish between facts and values. A lot of the debate that one hears on any given topic has to do with confusing facts with values. Facts are points that we should all basically agree on, or at least agree that there is some uncertainty about it. With values, it's quite legitimate for all of us to disagree on what we think is appropriate and desirable. There are no rights and wrongs in terms of value judgements. There are no experts about value judgements. The whole debate about sustainable development has to do with integrating environmental values and economic values, both for this generation as well as how we think about what we do today relative to what happens 50 years from now. Those are value judgements. And I would argue that really what we need are informed values that are cognizant of the information that we have, the uncertainties in the problems and use logic and reason to set priorities as a basis for decisions. That is to say, I do not think that attention to media debate alone is a good judge of public opinion. Much of the debate that is joined in media does not have the full benefit of what science can tell us about a problem, what the uncertainties are, and does not face up to the tough issue of tradeoffs.

This brings me to the role of science in this whole question of debate over sustainable development. I think science can provide a better understanding of complexity. (See Exhibit 5-14.) At best, science can help us gain more insight into the interrelations. Environmental systems are so complex that we can never hope to have perfect knowledge. I would also urge that an integrated view is needed. A lot of the times scientists spend many years of their careers focusing on little corners of big complicated problems rather than addressing how we can integrate the concerns of different disciplines. I would urge that multidisciplinary views on these problems as being particularly important. I think we need scientists who are willing to speculate, willing to talk about what they think is likely, willing to state their views of terms of probabilities rather than certainties because we don't have certainties. And finally I think that communicating with the public about hazards and about the issue of priorities is an extremely important part of any aspect of this public policy issue.

My final points are these: we need better decisions if we are going to make progress towards a better environment. (See Exhibit 5-15.) I think that sustainable development is an enormously important concept but unfortunately it does not provide a blueprint for how to proceed. Informed value judgements and processes to structure these decisions in a complete way are a key to making progress. Finally, I would add a caution: beware of technological fixes. I gave a somewhat similar talk at Globe'90, the Environmental Conference in Vancouver recently, and I was astounded to the degree which people were willing to stand up and say that technology will save us in terms of how we interact with the environment. Technology will not stop global warming and will not stop the loss of genetic diversity. I think that informed decisions are our best opportunity. Thank you very much.

Thanks to Dr. Tim McDaniels from Chris Boatman

Tim, I would like to thank you on behalf of the Forum attendees for a thought-provoking presentation. You have given us a lot of food for thought for us to bring to the workshops tomorrow. Those are some very important questions that all of us are starting to wrestle with, and we must find some solution if we are to move ahead.

We don't have any questions from the audience for Tim, and I know Tim has also got to rush to catch a plane. So maybe, Tim, if we just ask you to come back so I can present you one of these hand-carved bowls that we have been giving to our guest speakers. And now, on behalf of the group I'd like to thank you again very much.

Exhibit 5-1

SUSTAINABLE DEVELOPMENT, PUBLIC VALUES AND ELECTRICAL ENERGY CHOICES

by

Tim McDaniels

May 1990

Exhibit 5-2

OUTLINE

1. Introduction: Environmental Decisions
2. Sustainable Development Concepts
3. Example: CTMP Mills
4. Making Better Decisions

Exhibit 5-3

ENVIRONMENTAL ISSUES AS DECISION PROBLEMS

- Individuals, organizations, governments
- Choices
- Alternatives

=> Need to Make Better Decisions

Exhibit 5-4

FEATURES OF ENVIRONMENTAL DECISIONS

- Multiple objectives
- Scientific uncertainties
- Multi-disciplinary
- Incentives
- Institutions
- Long time horizon
- High stakes

Exhibit 5-5

SUSTAINABLE DEVELOPMENT:

BASIC CONCEPTS

- Integrate Economy/Environment
- Future Generations
- Resource Inputs
- Interrelated Decisions

A Prescription for Decisions?

Exhibit 5-6

SUSTAINABLE DEVELOPMENT

PRACTICAL DEFINITION?

"No Reduction in Environmental Capital..."

Exhibit 5-7

EXAMPLE: CTMP MILLS

- Underutilized Material
- Lower Environmental Costs
- Reduces Resource Inputs
- Increases Energy
- Sustainable?

Exhibit 5-8

TRADEOFFS BETWEEN

ENVIRONMENTAL AND ECONOMIC CAPITAL ARE UNAVOIDABLE AS:

- Population increases
- Income increases

Exhibit 5-9

SUSTAINABLE DEVELOPMENT

INSIGHTS

- IMPORTANT Concept
- NOT a Prescription
- CAN'T Escape Tradeoffs
- GAIN perspectives on:
    - Context
    - Tradeoffs
    - Role of Science

Exhibit 5-10

CONTEXT

Ask the right questions

FORESTRY

What kind of Province?

What kind of resource development?

How to utilize unallocated wood wastes?

Exhibit 5-11

ENERGY

What kind of
Province?

How much power
is needed and
how to use it?

How to supply
next power
increments?

Exhibit 5-12

FORESTRY AND ENERGY

- Integrated decisions needed on pulp and energy development
- Number of new mills has major influence on new generation requirements

Exhibit 5-13

VALUE JUDGEMENTS

A KEY COMPONENT

- No rights or wrongs
- Current vs. future
- Environmental vs. economic capital
- INFORMED judgements needed

Exhibit 5-14

ROLE OF SCIENCE

- Provide better understanding of complexity
- Integrated view needed
- Willingness to speculate
- Communicating with public

Exhibit 5-15

CONCLUSIONS

- Better decisions needed
- Sustainable development no prescription
- Informed value judgements a key
- Beware technological fixes

Introduction of Speaker, John Elizalde

Chris Boatman
Conference Chairman
B.C. Hydro

Introduction of Speaker, John Elizalde

Our next speaker comes to us from Bonneville Power Administration and John Elizalde is going to speak to us on "Do Market Forces Encourage Conservation?" John is Chief, Residential Programs Branch, Bonneville Power Administration. He is a graduate of Wittenberg University with a degree in business administration. He has held a number of positions with Bonneville Power in the environmental fields. He has been involved with residential, commercial and industrial sectors. The Division of Resource Management is responsible for the development and implementation of conservation programs through the promotion of energy efficiency and the operation of generation acquisition programs. I'd like you to welcome John Elizalde.

Do Market Forces Encourage Conservation?

John Elizalde
Chief, Residential Programs Branch
Bonneville Power Administration

Introduction

I'd like to say a couple of things first to set the stage. We at Bonneville are a wholesaler of electricity. We sell the electricity generated by dams on the Columbia River in the Pacific Northwest States, Montana, west of the Continental Divide, Idaho, Oregon and Washington. We serve about half of the region in terms of load. There are investor-owned utilities that serve the rest, as well as many of our publicly owned utilities customers who have their own generation.

This presentation will tell you what the Bonneville Power Administration has learned about energy conservation. This should be of interest because Bonneville and B.C. Hydro face many of the same choices for our energy future.

Bonneville has not tried to use rates as a way to influence economic choices by consumers. We did not have to; as you will see, retail rates went up steeply in the early 1980s.

Points to look for:

1. The unique features of each end-use sector. Clearly there are differences that should influence both utility actions and consumer expectations.

2. Try to assess where you fit in each sector. As a homeowner do you make decisions based on different criteria than you do at work? Do you respond in a way similar to the commercial or industrial sector?

3. Ask questions; do not expect answers. Test what you hear with what you have seen happen or with what you think is reasonable.

4. Some of this may sound like common sense. I have found that most of what we learn is very reasonable - after we learn it.

U.S. Pacific Northwest in the 1980s - An Economic Summary

The region suffered from an economic recession that was widespread in the United States. Employment levels dropped at the start of the decade and rebounded slowly. (See Exhibit 5-16.) There were only 8000 more jobs in the region in 1984 than there were in 1980. But employment growth has been steady since 1985.

Not surprising, per capita income slumped in the early years. (See Exhibit 5-17.) Again, the last part of the decade has seen steady growth.

These are key statistics for our purposes. I will refer back to these data from time to time:

1. Retail electricity prices rose very steeply between 1980 and 1984 as the region began paying for three nuclear powerplants while getting power from only one plant. (See Exhibit 5-18.) We should see the effects of this increase as we talk about conservation programs.

2. Retail electricity rates have stabilized and have actually fallen slightly in real terms during the last half of the decade. Again, we should learn from this.

3. Commercial floor space has growth throughout the period. However, what began as sluggish growth is now very robust. (See Exhibit 5-19.)

In summary, our experience in starting and operating programs occurred during a topsy-turvy decade. There was a major volcano eruption; a recession; a power deficit, then a surplus, then a load-resource balance; the largest municipal bond default in U.S. history with two WPPSS nuclear projects and the mothballing of two more nuclear plants. We start this decade going in the opposite direction economically. However, we have a new awareness of the environmental costs of growth, serious discussion of the greenhouse effect and concern over endangered species. The time is right to take stock of our efficiency lessons.

Residential Sector

The data are easiest to understand in this sector. Our load forecasters tell us that for every ten percent increase in residential electricity rates, we will see a 2.8 percent decrease in electricity use.

Bonneville has operated a weatherization program since 1980. We have detailed (statistically valid) evaluation data that tells us how much electricity we have saved. (See Exhibit 5-20.) These data come from a number of different years; we can track end use through desegregation of billing records and by end-use metering.

Our data show us that there was a real decrease in electricity use that tracks with the rate increases. As we look at data for homes that were both in the program and those that were not, we see that electricity use dropped. (See Exhibit 5-21.) Note that when rates stabilized, use began to sneak up again.

Our data also show how the program impacted the use of electricity for space heating. Whereas all homes used less electricity, the program homes used significantly less. Our evaluations of these homes in subsequent years (not shown here) show continued decrease in electricity use while the non-participants have increased their use.

The point here is that price-induced decreases in electricity use may well be a result of behaviour, not investments in conservation measures. And customer behaviour can change and take the "efficiencies" with them.

Commercial Sector

This sector has less price elasticity than the residential sector. Bonneville forecasters tell us there would be a 1.8 percent drop in electricity use for each ten percent increase in commercial rates.

This tells us that the end-users in this sector are less interested in the amount of electricity they use. We have seen that in the responses we have had to our programs.

Program response has never been robust and the complexities of the end-use technologies and the complex decision-making have made this sector the most difficult for Bonneville. (See Exhibit 5-22.)

Decision-making is quite dispersed in commercial buildings where there are tenants paying power bills, where power costs are generally insignificant in terms of operating costs, where owners are often off-site, where operations of the building can be as significant to the energy use of the equipment itself, and where first cost generally drives decision-making.

Although Bonneville has added conservation measures to hundreds of commercial buildings of all sizes, ages, shapes, end-uses, ownership patterns and equipment; we still do not know a tested and robust way to verify the savings from the conservation measures in an individual building.

We have located a host of variables that impact commercial electricity use: (See Exhibit 5-23.)

- hours of occupancy
- change in equipment use
- change in tenants of use
- change in HVAC set point
- change in management or staff
- measures disconnected
- change in business volume
- change in heated areas
- envelop modifications
- measures malfunctioning

Our experience is that as economic growth accelerated, these variables became even more difficult to measure or account for in building energy use.

We have settled on a general approach to commercial sector program design. (See Exhibit 5-24.) The major feature is variety. The sector is so diverse that no one or two activities will be effective.

We think it wise to try to match the conservation efficiency measures to the building and the most likely uses for that building. This is as opposed to trying to select measures that apply to a specific tenant. The yogurt shop today may be a tanning salon tomorrow. Of course, sensitivity to the tenant needs will be required.

Be very clear with the customers about what you can assure and what you cannot. Increasing the efficiency can be assured by the installation of measures; a reduced power bill can only come if none of the above variables confound the effects of the measures.

Best opportunities for installing conservation measures in the Commercial Sector come at times when new buildings are being designed, when buildings are being renovated (generally for purposes other than energy use), or when tenants are changing. (See Exhibit 5-25.) In other words, the conservation program activity must match the owner's regular business cycle.

Always evaluate the conservation programs. In this sector, use a control group. The variables mentioned above make it very hard to verify savings in a single building. The use of the control will take those variables into consideration and control for trends in the sector's economic activity.

Industrial Sector

This sector has very high energy use, and is far less complex in its energy decision-making. (See Exhibit 5-26.) Unfortunately, it is not very interested in its energy use. (See Exhibit 5-27.) Again, energy costs are not a major operating cost except in isolated instances.

The response to price increases is about that of the residential sector. Again, we need to be mindful of how behaviour can reduce electricity use. Slightly different behaviour can increase that use once the impact of the rate increase has passed.

Decision-makers in this sector will not tolerate any interference with the day-to-day operation of the facility. These end-users are far more interested in keeping their plant in operation than they are in saving energy.

There is a need to respect proprietary information. This is very important when utility staff work through industry associations, and when evaluations or case studies are prepared.

The savings potential is very high. And the Bonneville experience has been that the savings are also very low cost!

There is a caveat about industrial conservation savings. Whereas the actual savings often exceed the engineering estimates, we do not know what a reasonable measure of life is. Industry tends to continually renew itself, therefore, an individual measure may be replaced during a process change or renovation while it is still useful. (See Exhibit 5-28.)

Again, focus on best opportunities. It makes sense to deal with industry as part of their business cycle. (See Exhibit 5-29.)

1. Approach the industry when a new plant is under design.

2. Seek efficiencies when a plant is being renovated or when a process modification is being installed.

3. Assist the industry during periods of expansion.

If incentives are to be tried, we believe savings can best be assessed by agreeing to specific energy efficiency measurement--other than a power consumption meter reading.

1. Use the plant output per unit of electricity consumed.

2. In the Bonneville aluminum smelter program we are using a "pounds-of-aluminum produced per kW·h consumed" benchmark. Bonneville pays on the quarterly difference in achieved production/kW·h against the benchmark.

Bonneville is trying two different approaches with our industrial sector. At this time, we have only limited experience with one approach.

With small plants we are using a program that invites plants to participate whenever they have business cycle opportunities. (See Exhibit 5-30.) This requires regular contact by utility staff so the program is readily available. We verify the savings after the installation is complete and we pay an incentive over a number of years as the savings are realized.

We are planning a major plant program that is more closely modelled after the aluminum plant program mentioned above. (See Exhibit 5-31.) In this program we would have an open contract with each of the major plants in our system. (See Exhibit 5-27.) We would continually measure consumption and production. As the efficiency levels increase we would make rebate payments. Because these major facilities are continually under some form of renovation, this makes more sense than the case-by-case approach used with smaller plants.

What Have We Learned - A Summary

The end-use sectors are quite different in the way they deal with electricity. As a utility we need to adapt our activities to meet these customer expectations and circumstances.

Increased economic activity during the good times make it all the more important to focus on energy efficiency. The business sectors are often so interested in taking advantage of the economic conditions that their interest in energy is reduced.

Commercial turnover and changes in electricity use have been greater than we had expected during this growth period. This turnover makes it all the more difficult to assess the effectiveness of our programs.

We are finally making a headway with industry. Again, they have become more receptive to our conservation advances as the economy has improved.

As the economy stays strong, we in the utility industry expect to see more and more load growth, and more and more need for new electricity resources.

Homeowners, building owners, and industry all use a product and we in the electric utility will need more. Your efficient use of electricity is important and a partnership to improve that efficient use can be profitable to both partners.

Thanks to John Elizalde by Chris Boatman

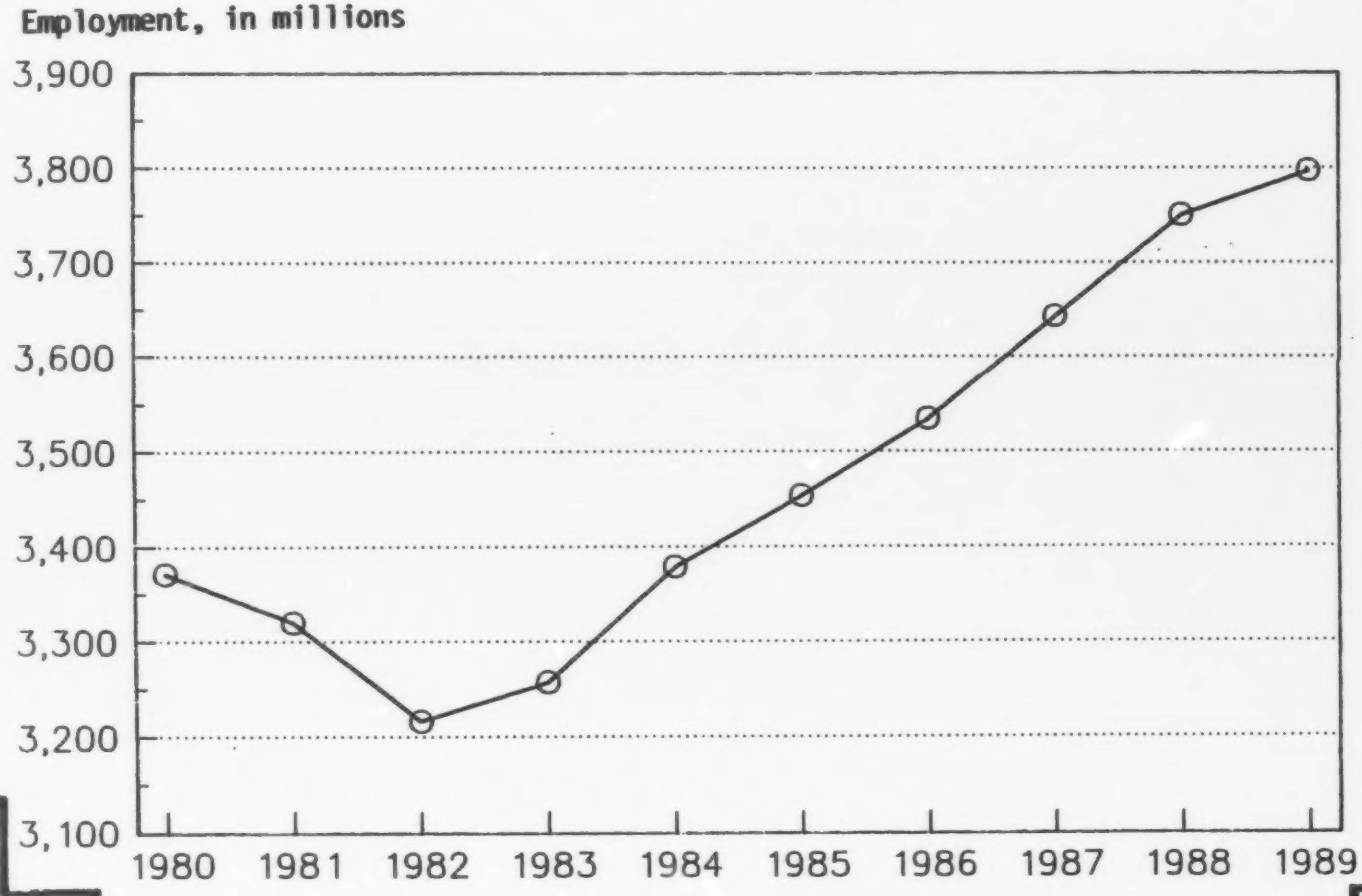
Thank you John very much. Don't leave please, I've got something for you, too. I hope that the journey through your experiences of the last 10 years again will help us as we continue to develop our own Power Smart programs. Certainly the relationship between Bonneville and B.C. Hydro is one that is very important in keeping that work going.

John, on behalf of this assembly, I'd like to offer you one of these carved bowls.

Exhibit 5-16

PACIFIC NORTHWEST

TOTAL EMPLOYMENT

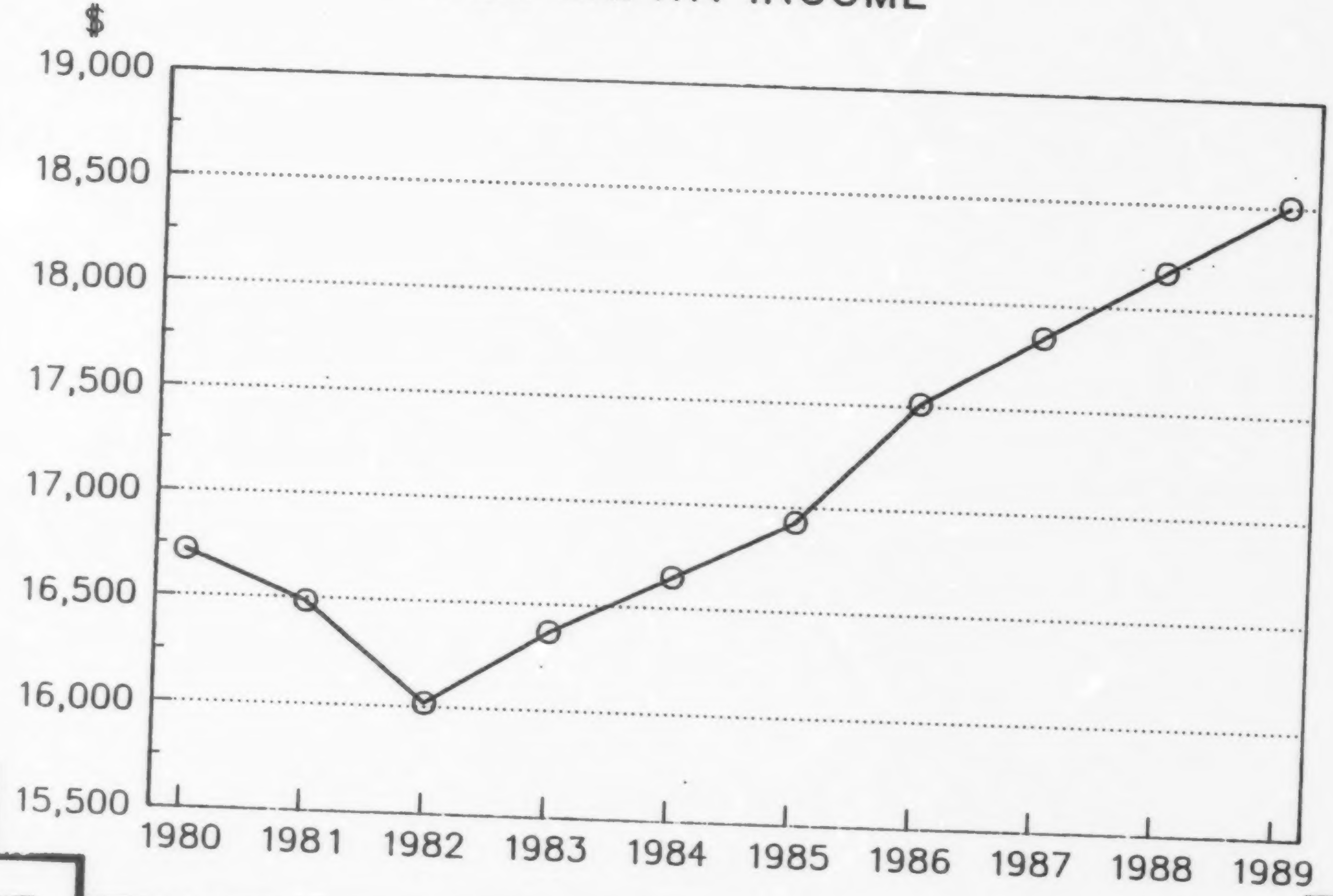


Bonneville Power Administration

Exhibit 5-17

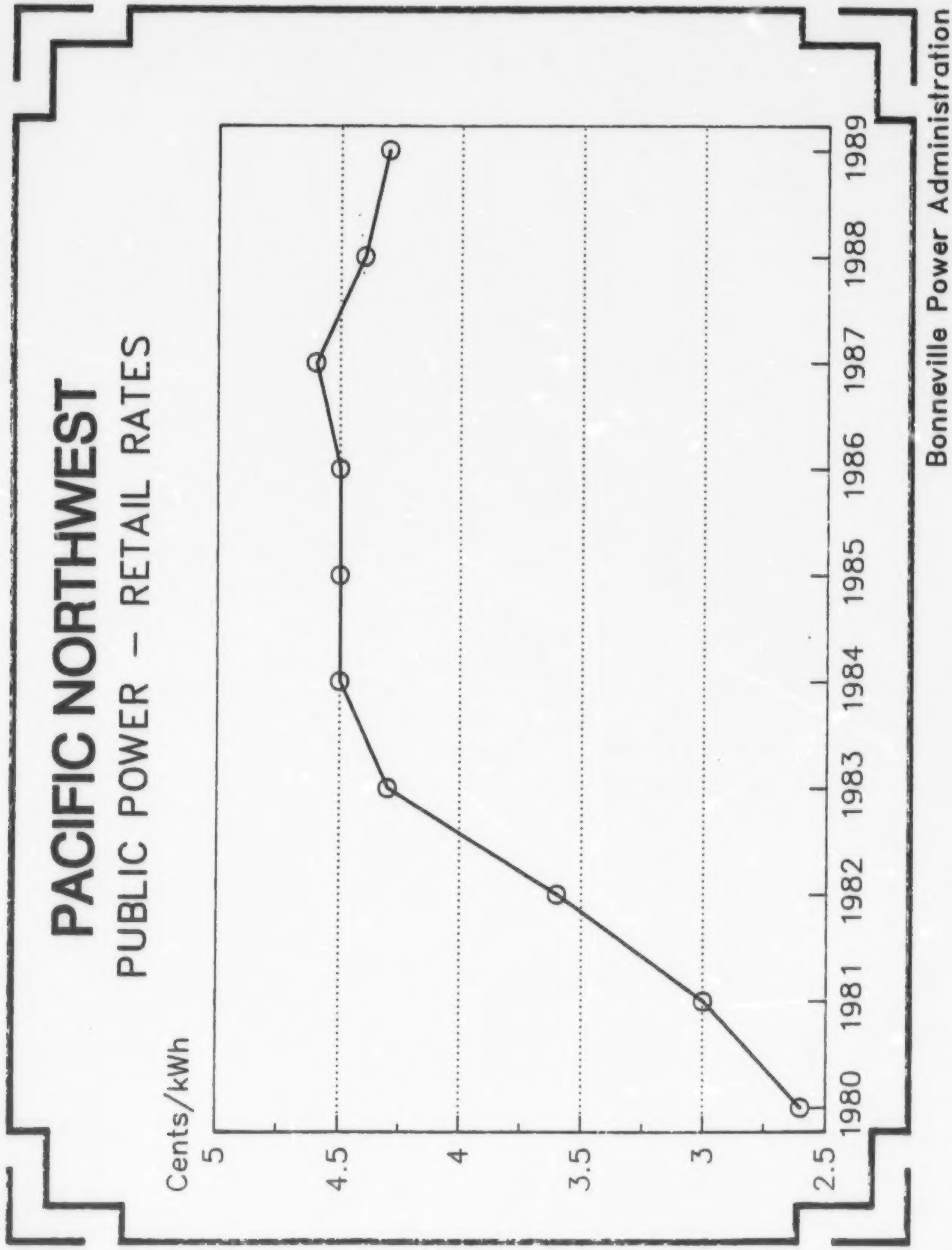
PACIFIC NORTHWEST

PER CAPITA INCOME



Bonneville Power Administration

Exhibit 5-18



PACIFIC NORTHWEST

PUBLIC POWER – RETAIL RATES

Bonneville Power Administration

Exhibit 5-19

PACIFIC NORTHWEST
COMMERCIAL FLOOR SPACE

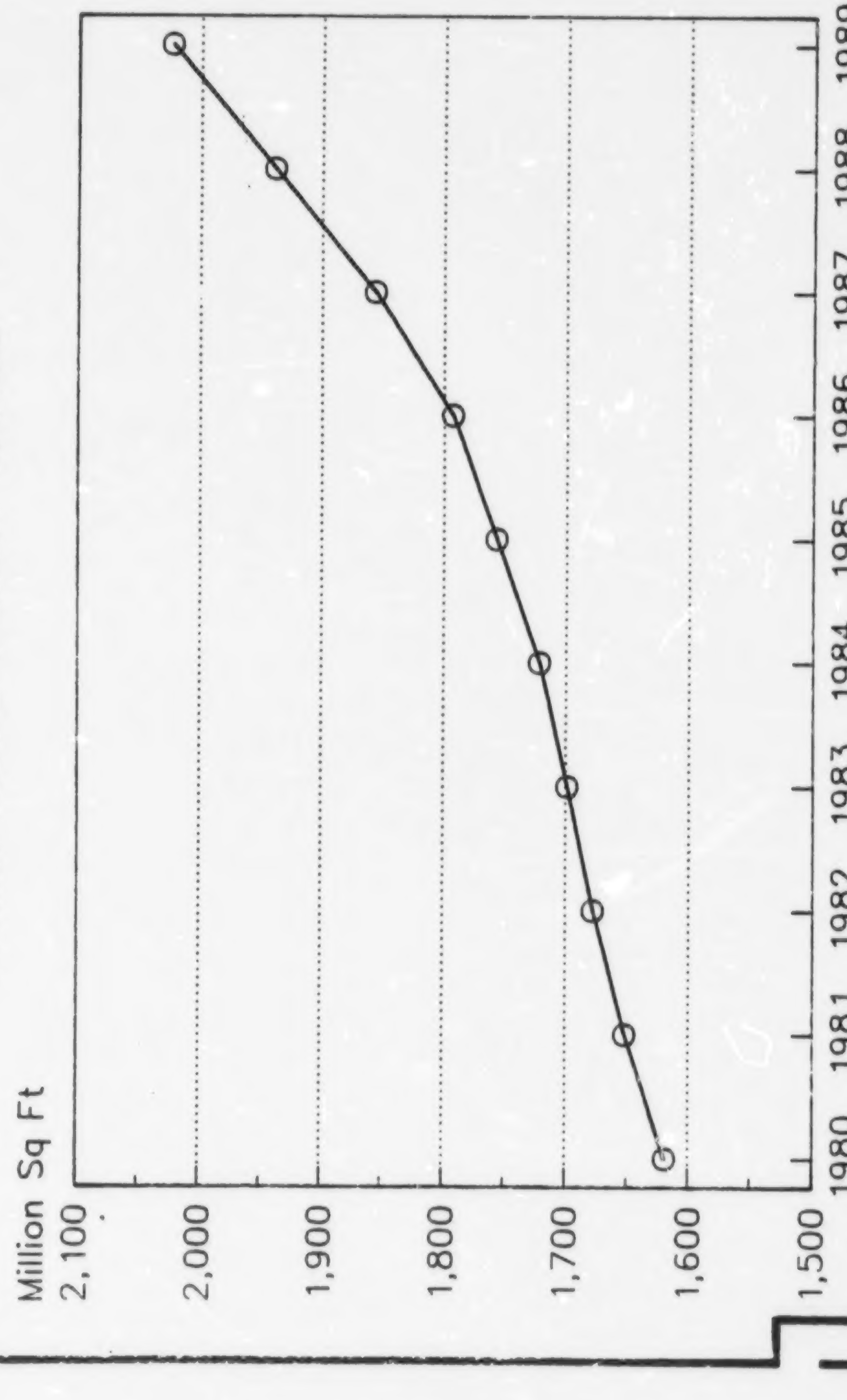


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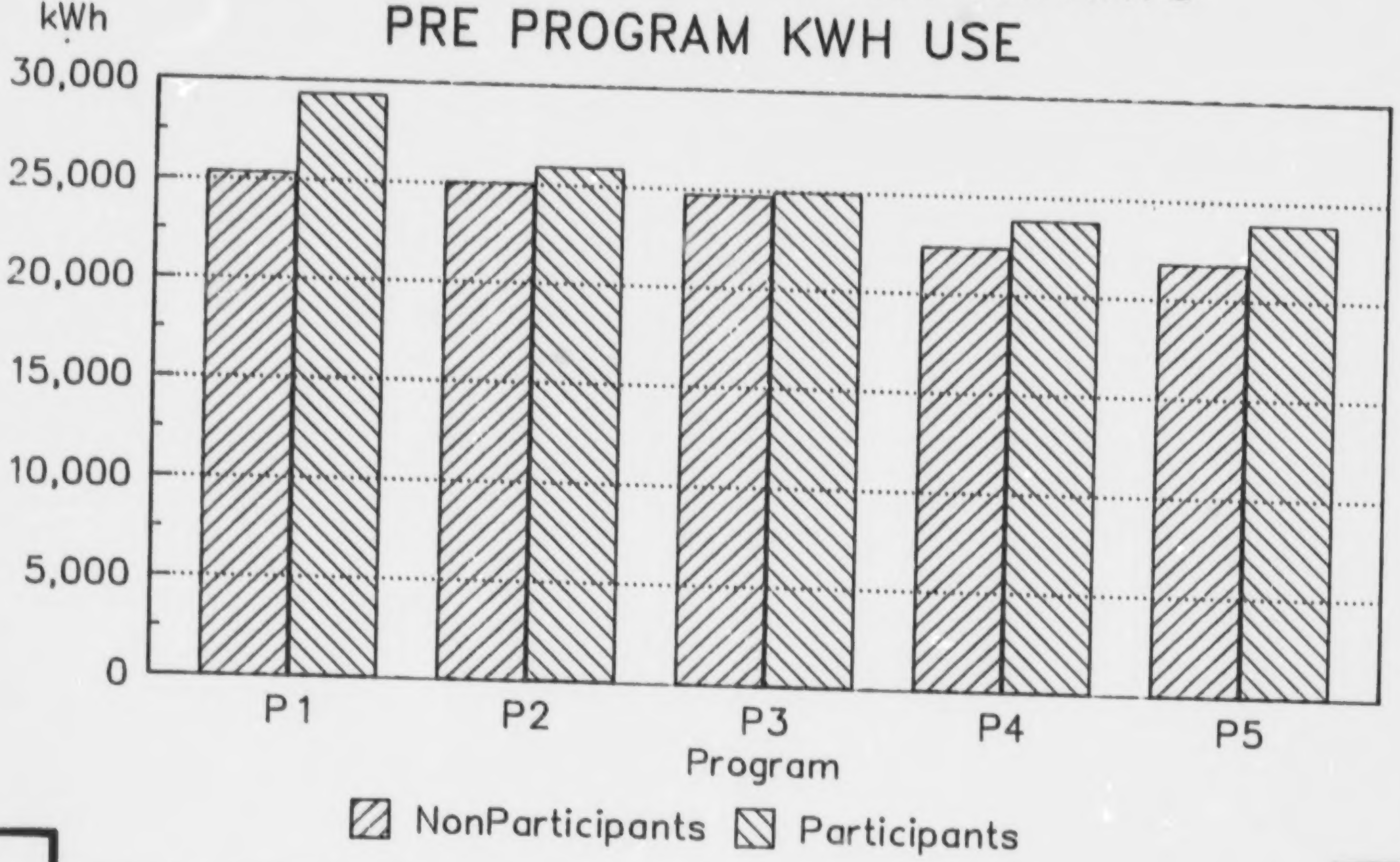
Exhibit 5-20

RESIDENTIAL SECTOR
WEATHERIZATION
NONPARTICIPANTS AND PARTICIPANTS
PRE PROGRAM KWH USE



Bonneville Power Administration

Exhibit 5-21

RESIDENTIAL SECTOR
WEATHERIZATION
NONPARTICIPANTS AND PARTICIPANTS
PRE AND POST PROGRAM KWH USE

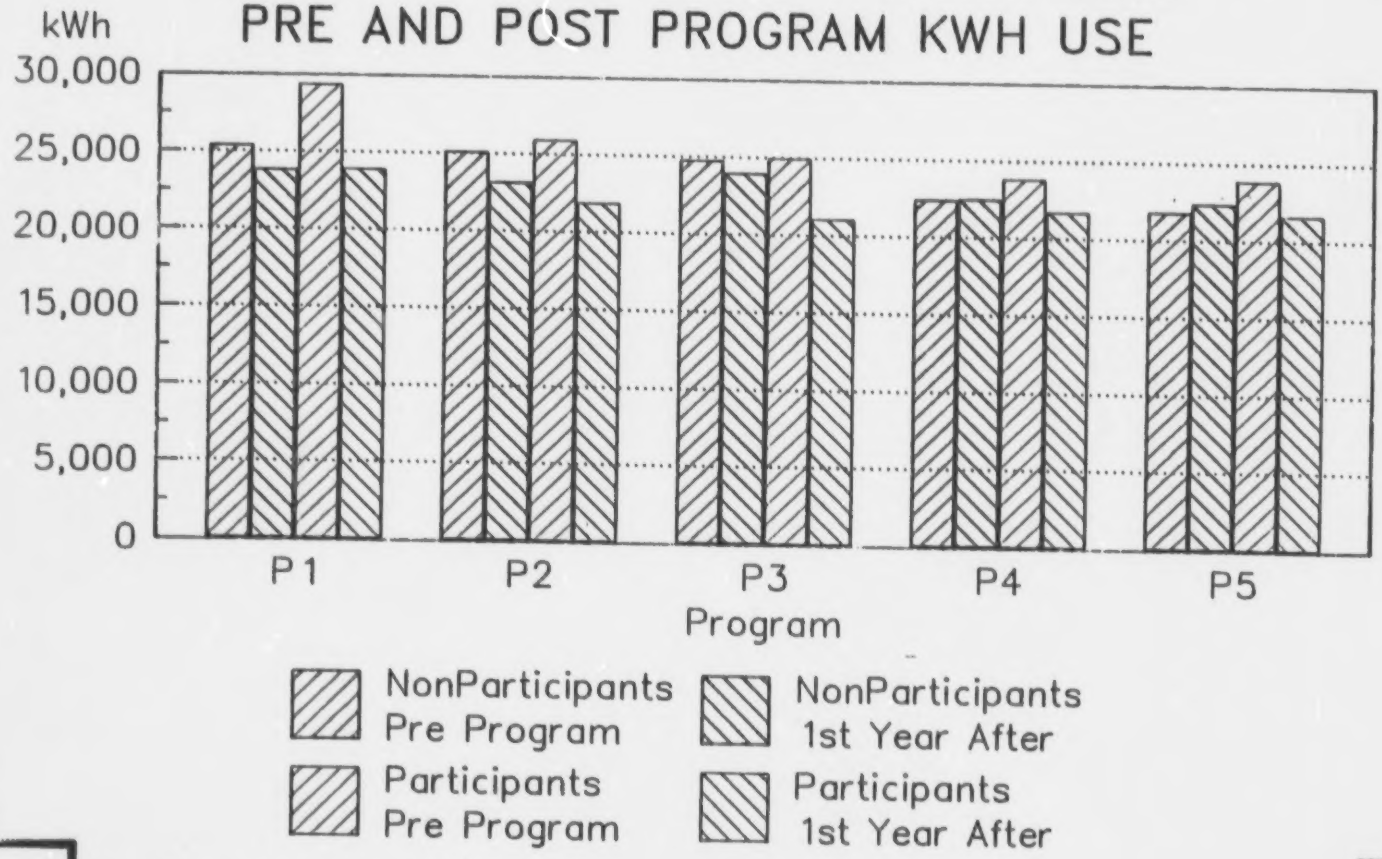


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Exhibit 5-22

COMMERCIAL SECTOR

- Complex decision making
- Complex end uses
- Less price elasticity than homes or industry
- Perceptions of electricity costs vary
- Difficult finding and verifying savings

Bonneville Power Administration

Exhibit 5-23

COMMERCIAL SECTOR

Variables

- Hours of occupancy
- Change in equipment use
- Change in amount of use
- Envelop modifications
- Change in management/staff
- Measures disconnected
- Change in business volume
- Change in heated area
- Change in HVAC set point
- Measure malfunction/disconnect
- Changes in tenancy or occupancy

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Exhibit 5-24

COMMERCIAL SECTOR

Approaches

- Variety of services
- Match measures to building and be sensitive to business needs
- Focus on best opportunity
- Be clear with customer upfront about savings and power bill
- Evaluate with control group
- Start incentives at incremental cost
  - energy efficient cost minus standard cost

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Exhibit 5-25

COMMERCIAL SECTOR

Best Opportunities:

WITH THE BUSINESS CYCLE

- When building is under design
- When building is being renovated
- When tenants are changing

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Exhibit 5-26

100 LARGEST INDUSTRIAL PLANTS

RANKED BY ELECTRIC ENERGY USE

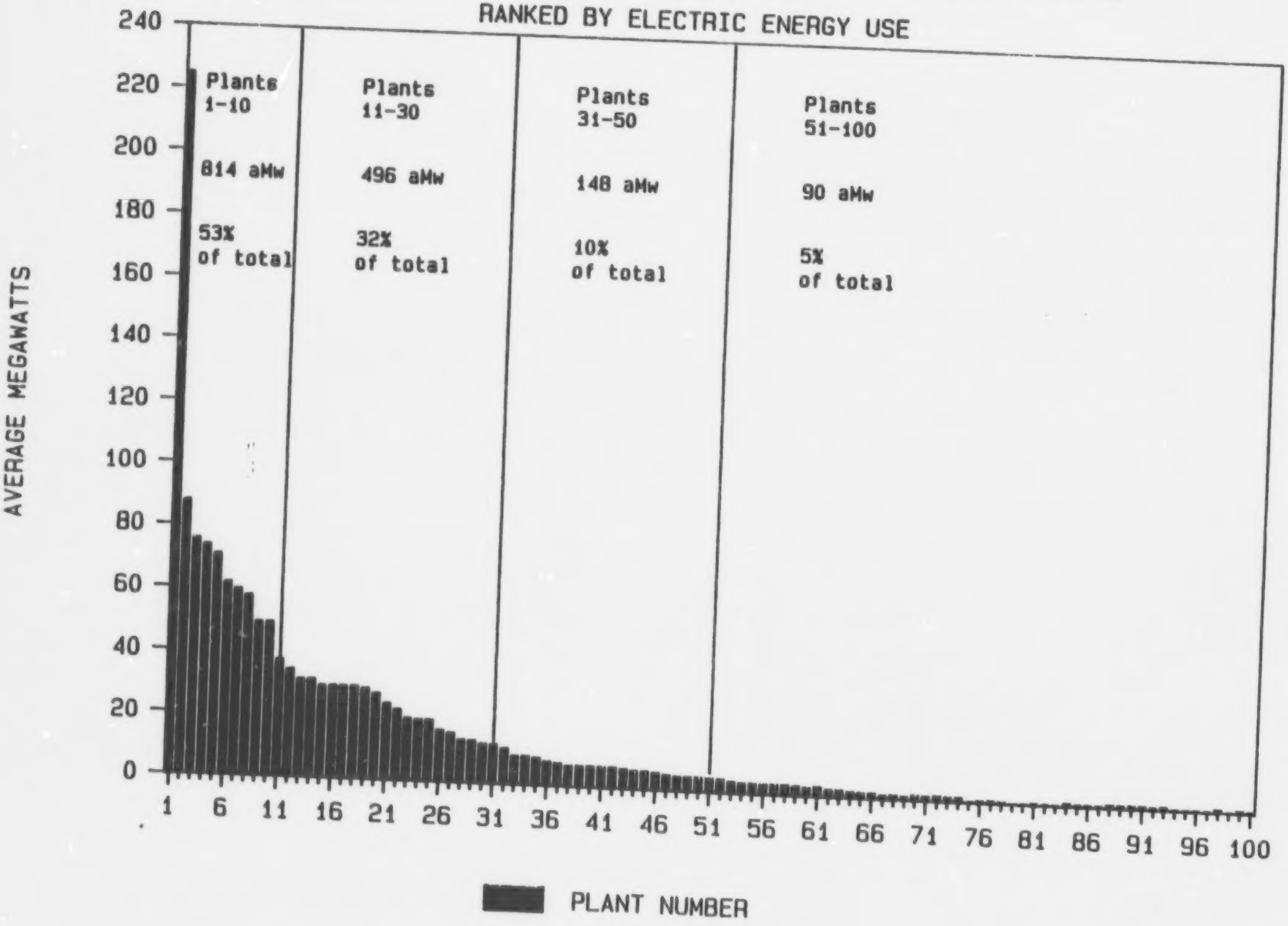

Exhibit 5-27

INDUSTRIAL SECTOR

- Generally little interest in energy use
- No tolerance with interference with operations
- Price elasticity similar to homes
- Respect proprietary information
- Potential savings high

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Exhibit 5-28

INDUSTRIAL SECTOR

- Difficult to assess measure life
- Verified savings exceed estimates often
- Evaluate based on logical benchmark
  - plant output/energy use
  - i.e. pounds produced/kwh consumed
- Pursue best opportunities

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Exhibit 5-29

INDUSTRIAL SECTOR

Best Opportunities

WITH THE BUSINESS CYCLE

- When plant is under design
- When plant is being renovated
- When plant/process is being expanded

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Exhibit 5-30

INDUSTRIAL SECTOR

Approaches

Smaller Plants

- Must have regular contacts
- Verify savings after installation
- Pay for savings over time, as they appear

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Exhibit 5-31

INDUSTRIAL SECTOR

Approaches

Major Plants

- Open ended contract
- Integrate efficiency into each process change
- Top 100 industrial end users
- Pay for savings over time, as they appear

Bonneville Power Administration

Future B.C. Lifestyle
High School Presentative

Kelly Road Secondary School
Prince George, B.C.

High School Presentation by Kelly Road Secondary School Students

Characters

Captain Energy - Energetic superhero, 24 years old.

Joan Austin - B.C. Hydro employee in the future, 28 years old.

Catherine Banks - B.C. Hydro employee in the present, 36 years old.

Betty Blair - Secretary at B.C. Hydro in the past, 27 years old. (Gives speech on the past because her "Boss" is away.)

"The Smith Family":
Mom - Margaret, a housewife, 38 years old.
Dad - Edward, a businessman, 42 years old.
Twins - Amy and Sara, 15 years old.
Brother - Clifford, 14 years old and discovering hormones.

"The Jones Family":
Mom - Debbie, a nurse, 41 years old.
Dad - Chris, a teacher, 41 years old.
Twins - Jessica and Karen, 15 years old.
Brother - Michael, 13 years old.

"The Anderson Family"
Mom - Susan, a doctor, 40 years old.
Dad - Bill, an advertiser, 42 years old.
Twins - Paige and Leila, 15 years old.
Brother - Steve, 13 years old.

The play begins in the future, somewhere in British Columbia.

Sound of spaceship crashing. (Captain posed and Joan posed.)

Narrator: Captain Energy is definitely one to investigate. He landed here on earth on his travels from Zircon, route 4. To get here you take the 157 turn off....Never mind. Well, he is 24 years old and not very good at reading maps. He took a wrong turn and landed in British Columbia, sometime in the future. Or should I say crashed. He ran out of energy and now he is trying to find some.

This is Joan Austin, she's 28 or so she says, and works for B.C. Hydro. So let's follow her, she's on her daily routine.

(Narrator leaves and Captain and Joan come in action.)

Captain: Whoa, that was some landing! (sees Joan) Hey! Who the heck are you?

Joan: Don't you think I should be asking the questions? Who the heck are you?

Captain: Hey, I asked you first! But, however, I'm Captain Energy.

Joan: Is there an echo in here? (looks around) And I'm Joan Austin. I work for B.C. Hydro.

Captain: That's good! I need some energy for my spaceship. Where can I find some?

Joan: Try going back a few decades! Energy is getting to be scarce around here...(prepared speech)

Captain: Whoa! I can't believe it's that bad!

Joan: Well, I'll show you. I'm on my way to the Anderson house right now. You can see for yourself.

(Captain and Joan walk to the Anderson's)

(Narrator appears, family posed with daughters at a kitchen table, son eating cereal, mother and father looking through their briefcases.)

Narrator: (Walks over to father.) This is William Anderson, his friends call him Bill. I'd call him energy conscious. Sure, when he was younger he didn't care about energy costs but now, hey, he's paying the B.C. Hydro bill, and he gets after anyone in his family who wastes energy. He's 42 and works in an advertising agency.

(Walks over to Susan Anderson.) This is Susan Anderson, wife of Bill Anderson. She's also wised up. She's 40 and is a doctor at Raymond Hudson Memorial Hospital.

(Narrator walks over to Paige and Leila.) This is Paige and Leila Anderson. They are 15 and they are also energy-conscious, mostly because their parents bug them so much about energy.

(Narrator walks over to Steve.) And last, but not least, this is Steve Anderson, the aspiring teenager of the family; he's 12 going on 13. He's the most energy-conscious in the family. You should see him blow up when someone leaves the toaster plugged in.

(Lights go off while narrator leaves.)

Susan: Has everyone eaten their breakfast? (There are muffled yes's and nods from the family.) Good. (Stands up and closes her briefcase.) I'm off to the hospital. Dinner's in the fridge. (Starts to leave then calls back.) Last one out, turn off all the lights. See you at 5:00 p.m. Bye. Have a good day. (Leaves.)

Bill: Well, I'm off too! Unplug the TV and toaster before you leave. And don't forget to turn the heat down. I'll be home at 5:30 p.m. Don't be late for school!

Paige: Hey Leila?!

Leila: Yes?

Paige: Do you know if that B.C. Hydro person is coming to school today?

Leila: Yeah! She is. Maybe she can give us some more ways to save energy.

Paige: I hope so! You know how uptight mom and dad get about energy. Did you hear them as they left? Turn off the lights, turn down the heat, turn off the radio, jeez.

Leila: But that's good. We have to conserve energy or we won't have any more when we get older.

Paige: I know what you mean. Can you imagine living like cavemen when we run out of energy?

Steve: That would be scary! That's why I'm so energy-conscious. I want to have energy when I have my children.

Leila: Who's going to want to have your kid?

(Kids get up and start to turn down heat, etc.)

Paige: Did you know Leila, Stevie's got a girlfriend. Her name is Paula!

Leila & Paige: Ooh! Kissie, kissie!!

(Everyone starts to leave and girls are laughing.)

Steve: (Checks to make sure that everything is off then calls out to the girls.) She's not my girlfriend!

(Lights off, lights on with B.C. Hydro person and Captain Energy.)

Captain: Boy, they really are energy-conscious! If everyone is careful like this there shouldn't be a problem with wasted energy.

Joan: Yes, that's true but the problem didn't start here. It started, um, well I don't know where it started.

Captain: I'll try to go back about 30 years, to 1990. Maybe I can find out where all the energy went.

Joan: I hope so! Good luck! (Leaves.)

Captain: Boy, me, Captain Energy, the saviour of all energy, great and small. I like the sound of it. (Thinks for a moment.) Gee,where did I put my time-travelling machine? It's got to be around here somewhere. (Leaves, mumbling to himself about his time machine.)

(Lights off. Lights on again with Narrator and Captain Energy and Catherine Bands all posed.)

Narrator: Now it's the year 1990. And this (point to Catherine) is Catherine Banks. She is 36 and works for B.C. Hydro and (points to Captain) you already know Captain Energy. Is there an echo in here? (Leaves.)

Captain: Hey, are you a B.C. Hydro dude?

Catherine: Dude, no that won't do! Intelligent, charming and highly good looking, above average human being is much, much more appropriate!

Captain: I'll introduce myself. I'm Captain Energy.

Catherine: Is there an echo in here?

Captain: Don't mind that, it's been happening a lot lately. I was just wondering if you could possibly...no, actually I demand that you tell me about energy in 1990.

Catherine: I love a forward man! I'm sure that can be arranged.

Captain: Can you show me a typical family?

Catherine: Sure. I guess so. The Jones live right over there. (Points.) Come on.

(Lights off. Catherine and Captain leave. Lights on.)

(Narrator appears. Family posed. Jessica and Karen waiting for their eggs. Michael pouring juice. Debbie, (the mother) eating. Chris, (the father) eating.

Narrator: (Walks to Chris.) This is Chris Jones. He's a 41-year old maths teacher. He doesn't know much about energy conservation though.

(Walks to twins.) These are the family twins. They aren't identical. They're 15 and know a little bit about energy from school.

(Walks over to Michael.) This is Michael. His friends call him Mike. He is 13 and he doesn't even think much about energy.

(Narrator leaves.)

Jessica: Mom, Karen and I won't be home till 5:30 p.m. tonight. We've got volleyball practice after school.

Debbie:	Okay dear. Pack a snack in your lunch for after school.
Michael:	Hey Karen, do you get that B.C. Hydro lady in to talk to you today in school?
Karen:	I already heard her speak and it was really interesting.
Michael:	Yeah, I guess I learned quite a bit too. Of course, I didn't have a choice because my science teacher, Mr. Hick, is testing us on all the stuff she said.
Chris:	What did this B.C. Hydro woman talk about?
Karen:	Mostly about energy use, consumption and conservation.
Chris:	Why conservation? With all the water in B.C., they shouldn't have any problem keeping up with our energy demands.
Jessica:	Even if we do get more energy from the water, Dad, with the population growth and the energy demands of the extra people, the demand will eventually surpass the energy we can get from all the hydroelectric plants that can be built.
Michael:	Yeah, so the energy we have now won't be enough in future if we get a bigger population.
Debbie:	Right! that's why we should try and do our part to save energy for future generations.
Chris:	Turning out the light after you leave the room would even save some energy!
Karen:	Jessica and I are going to school. See you nuts later! (They leave.)
Debbie:	We've (points to Chris) got to get going too. Don't forget to turn out the light! (They leave.)

(Michael leaves and mimes turning off a light switch.)

(Lights off, Mike leaves. Lights on Captain goes on.)

Captain:	They're getting better but obviously energy wasting didn't start here. I'll go back to the 1960s to check it out.

(Lights off, Betty comes in. Lights on Captain and Betty posed.)

Narrator: (Points to Betty.) This is Betty Blair. She works at B.C. Hydro as a secretary for Harvey Johnson, a B.C. Hydro hot shot. She's 27 years old.

(Narrator leaves.)

Betty: (Sitting at her desk, speaking to Captain.) Yes, may I help you?

Captain: Can I talk to your boss?

Betty: I'm sorry, that's quite impossible. He's out of town at the moment.

Captain: Could you tell me about energy consumption here in 1967?

Betty: Of course. But by the way, what's your name?

Captain: Sorry. My name is Captain Energy.

Betty: (Does prepared speech.)

Captain: Could I see a typical family and how they conserve energy?

Betty: Sure! The Smith family lives right down the street.

(Lights off, Betty and Captain leave. Lights on. Narrator appears. Family posed.)

Narrator: (Walks over to father.) This is Edward Smith, the breadwinner of the family. He's 42 years old and a well-paid businessman.

(Walks over to mother.) May I introduce Margaret. She is 38 years old and a home-loving housewife. Mom of three, make that four, the hubby sometimes gets out of hand.

(Points to the twins.) The twins are 15 years old and they waste more energy running their radio, hot rollers and curling irons in a day than any normal person does in a month!

(Walks over to boy.) Clifford, the picked-on, teased younger brother, also incredibly wasteful. He makes a good point of leaving the lights on all over the house just to annoy his parents.

(The family scene begins having a discussion on energy.)

Sara: (Buttering her toast.) Hey, mom?!

Margaret: Yes dear?

Sara: Remember how I was telling you about how Amy and I were learning about energy consumption and stuff like that in science? Well, today a man from B.C. Hydro is coming to our school to explain more about all that stuff.

Margaret: Hasn't the school got better things to teach you than that? Who wants to learn about energy? It's not like you're going to become an electrician! Why doesn't the school teach some things useful like cooking, sewing and cleaning?

Amy: I thought it was kind of interesting, didn't you Clifford?

Clifford: Well, the B.C. Hydro man was okay but his secretary....Va Va Voom!!

Margaret: You're so crude Clifford! You must learn that from your father.

Edward: What was that about me?

Margaret: I was just remarking on how Clifford has inherited your crude characteristics.

Edward: Like what? (He belches.)

Margaret: Like that for example and also "Va Va Vooming" for woman!

Clifford: Come on Mom! (Goes to father.) We men have got to stick together. Hey Dad, while we're on the subject of energy; boy did this secretary have a lot! (Makes shapely signs with his hands.)

Margaret: Getting back to your class today girls, why is energy so important to us anyway? We have enough energy in this Province to last forever!

Sara: Oh Amy. I know that but it's still interesting to learn.

Amy: Yeah! Mom did you know...

Margaret: (Cuts her off.) Enough of this worthless gibberish about energy. (Points to children.) You three will be late for school. (Points to husband.) And you will be late for work. (As they leave she calls after them.) Don't forget your lunches!

(Lights off. Lights on with Captain, Joan, Catherine, Betty and Smith family.)

Captain: Boy, are they ever hopeless! Don't know one darn thing about energy. Our energy crisis definitely started here or maybe even earlier. (Steps forward, towards the audience.) Okay guys, (cast all coming out) let's face reality. There really isn't a Captain Energy. Sorry I had to fool you for so long. And, I hate to break this to you, but I can't travel through time to correct energy problems.

Joan: So what can you do now to stop an energy crisis from happening?

Catherine: It's quite simple really.

Betty: You could turn out lights when nobody is using them.

Margaret: Use a broom instead of a vacuum.

Edward: Carpool to work.

Amy: Turn down the heat at night.

Sara: There are many things you could do.

Clifford: So why don't you?

(Lights off.)

Introduction of Speaker, Ken Peterson

Chris Boatman
Conference Chairman
B.C. Hydro

Introduction of Speaker, Ken Peterson by Chris Boatman

Well it is my pleasure now to introduce to you a couple of speakers from Hydro. We've had a number of speakers from outside and I guess it's time now to tell you some of the thinking that has been going on inside B.C. Hydro over the last year. I'd like to start by introducing Mr. Ken Peterson, who is going to talk to us about B.C. Hydro's load forecast and resource alternatives. Ken has worked with B.C. Hydro since 1977 and he is presently our Director of Planning. His responsibilities as Head of the Planning Committee are Resource Planning and Policy Analysis. He has extensive experience in economic evaluation and policy analysis of major issues such as flexible supply planning. He has received his Masters degree in Economics from Northwestern University following a Bachelors degree in Economics from U.B.C. He has also worked with the Westwater Research Centre at U.B.C. Ladies and gentlemen, please welcome Mr. Ken Peterson.

B.C. Hydro's Load Forecast and Resource Alternatives

Ken Peterson
Director of Planning
B.C. Hydro

Thanks very much Chris. It's a pleasure to be here and talk about my favourite topic, load forecasts and resource planning.

All speakers hate to be asked to talk at this time of the day because we are the last thing between the audience and "happy hour". But I feel especially aggrieved. Hazel has trashed my profession, Irving trashed my lifestyle, Larry stole all my lines, and then I have to follow all these brilliant kids. I am going to do my best to be a "Grinch" and see if I can steal the fantasy of an easy solution to energy problems.

I am going to go back through the kinds of questions that we ask ourselves in planning, and that we all have to ask ourselves in this room, namely how much electricity do we need? What are the best sources to use to meet that demand? When do we need to schedule them? How do we manage to deal with the uncertainty involved with energy resource planning? I have to say that "lifestyles" is my favourite candidate for the overworked word of 1990. Not in the context that we are dealing with here, but it gets trotted out on just about every occasion. It's an advertisers dream. We have to remember that what we are really dealing with here is the derived demand for electricity. Now that does reveal itself in choices that can be characterized as lifestyles, but we can't think of lifestyles as a menu or a grouping we can just select, or more importantly manage people or the economy towards. I think there are things we can do to influence it and I'll have some comments on that later, but it's not something we have a ready solution for. Electricity is a derived demand, nobody needs kilowatt-hours directly. What we use it for is obviously for comfort, heat, entertainment, lighting and so on. The choices that are made are choices for end-use equipment run by electricity. These choices are driven by habits, by our cultural preferences, certainly by marketing, by legislative and other standards, and more importantly, in my view, by the price. Price does have an important impact on what we choose and how we use it.

Let's look at the way residential use has changed over the last 30 years since B.C. Hydro was first formed from the B.C. Power Commission and B.C. Electric. Residential use in 1960 was about 5 MW·h/a (5000 kW·h/a). (See Exhibit 5-32.) The typical house had a range, a fridge, perhaps a clothes washer, probably not a dryer, a radio or hi-fi, maybe a black and white television and a few small electrical appliances - toaster, kettle, clothes iron, perhaps a vacuum. All this resulted in a 5 MW·h/a use. In 1990 what we see in typical residential end-use (see Exhibit 5-33) is a range with a self-cleaning oven, a microwave, a refrigerator - perhaps one with an ice-maker which is energy using, a freezer, a clothes washer and dryer, a personal computer with a printer, a stereo amplifier, a CD player, a full stereo television - perhaps a couple of televisions, a VCR, a whole range of small electrical appliances, and even a few that have saunas and hot tubs. That all produces an average use in today's terms of 9 MW·h/a. So in a little over 25 years we have nearly doubled the average use in a typical household. In fact, if you extended that to 30 years we have slightly more than a doubling, from about 400 kW·h/mth to 800 kW·h/mth. Those are lifestyle-type choices; and I think the definition that Irving Fox gave us this morning applies to this whole range of electricity use. That is, people being driven by the need or desire to increase their income, and consumption levels.

Switching now to a bar chart on monthly energy use (see Exhibit 5-34); one sees in this chart a rapid increase from 400 kW·h/mth to 830 kW·h/mth by the end of fiscal year 1989. It has levelled off somewhat, but not completely. There is still a small secular growth in residential electricity use. We thought in the early 1980s that it would level off and actually decline with increasing efficiency. We are seeing that more efficient end-use equipment is available, but it hasn't been adopted as rapidly as projected. Also, the variety of end-uses has increased with multiple home entertainment equipment, personal computers and so on.

In the time period that we have seen this growth in residential account consumption, we have seen other growth that also drives the demand for electricity. The population has increased 1.8 times. Our economy has expanded, in terms of GDP, by 3.3 times and electricity use, in terms of sales of B.C. Hydro and its predecessors, has increased 6.8 times. Those are the principal drivers of the demand for electricity use per account which is still increasing at a lower rate, and more end-users in the residential, commercial and industrial sectors.

Looking at commercial use and industrial use, it's a little harder to get a coherent picture. As John Elizalde was saying earlier about Bonneville's situation when he described commercial use as being very complex. That's because, among other things, there's such a range of end-users, it's hard to characterize them. But we do know that the office of today, while perhaps being more energy-efficient overall, has a lot more equipment in it. A large component of commercial use is for lighting and that presents a real opportunity in terms of resource efficiency. It's about 18 percent of the total energy consumed currently in B.C. Hydro's total sales picture.

As an interesting example of industrial use, Tim McDaniels presented a decision-analysis of chemi-thermo-mechanical pulping (CTMP) and its implication for electricity use. (See Exhibit 5-35.) The difference between the Bleached Kraft Pulp (BKP) process and the CTMP process, results in a purchased electricity use for CTMP several times that of BKP. This takes into account the fact that BKP processes cogenerate a lot of their own electricity. This is, in fact, a promising area for energy supply as there are many more opportunities in the economy for increased cogeneration.

The next step is to put all these numbers together. That's what Exhibit 5-36 shows. It is an aggregation of what you get when you go behind the individual consumer and the individual end-use choices. It is an aggregation of millions of separate decisions that are made in the market place. That's the target that we must plan to supply. The range represented in Exhibit 5-36 is truly challenging in terms of developing a plan to meet it. It doesn't matter whether the plan is for conservation resources or new dams, or other sources, there's still an enormous amount of uncertainty to deal with. This isn't a representation of poor forecasting; in fact, we would be content if the actual demand over the next ten years turned out to be in that cross hatched band. Given the uncertainty in the economy, that's the range that realistically we have to plan for.

Hazel Henderson made some excellent points about the difference between economic forecasting and extrapolating from past trends, versus futurist-type forecasting which looks at an outcome and then tries to manage to that. So far we don't have a satisfactory handle on making sure that we can do it, but we do have some ideas about how we can incorporate some of those concepts. I'll talk a little bit about that at the end of the presentation today. However, the past, to some extent, is prologue. There is a lot of inertia in the system. We do know that when equipment is installed, it is going to be used, and that will produce certain results in terms of electricity use. Changes in values, changes in end-use consumption, whether it's just resource-efficiency or major changes in lifestyles, all take a long time to happen, especially the changes in values.

Another way to look at that uncertainty picture is to see what the range represents when we look at the year 2000. (See Exhibit 5-37.) The probable cross hatched band in Exhibit 5-36 is represented here with the probable forecast in the middle - probable meaning our most likely projection of what's going to happen. The range around that probable forecast, with an increase over ten years equivalent to five new CTMP mills (each the equivalent of the new one that is now being developed by the Howe Sound Pulp and Paper Limited, at Port Mellon), or it's equivalent to slightly more than the output of the proposed Site C hydroelectric project.

What happens if we end up providing energy for one of those paths and we actually have an outcome that's different? We know that some supply resources, like Site C, need seven to ten years of lead time. That means, starting in 1990, if we were to commit to a new hydroelectric project or even a major coal-fired station, by the year 2000 we would have an outcome that would come out to be somewhere in that band. We would only achieve an exact balance of loads and supply each year by accident. That's where managing the risk comes into the picture.

If you look back to the 1980s, you can see that we got it right for that decade. (See Exhibit 5-38.) We started the decade in load-resource balance, and we ended the decade in balance. I think that if we can look back at the end of the 1990's with the same kind of success, we will be very pleased with our planning. We hope that we can get there with a little less rocky road though, because during the 1980's we had plans for a significant number of additional plants. We wrote off $77 million for studies on the Hat Creek project. We wrote off studies on the northern rivers. We still have Site C waiting to be developed with a significant amount of spending already done on it. So this isn't the prescription for what to do in the 1990s, although the outcome itself was fine. We ended the decade with electricity consumption growing by 13 000 GW·h and having new hard hydroelectric resources brought on that had the capability to produce 13 000 GW·h/a. That was really the last major step of the Two-River Policy, and the mandate for B.C. Hydro to be the only builder of hydroelectric facilities serving energy demands in the Province. We know there's still a role for hydroelectric resources; but now the issues are much more complex in terms of what people of the Province want to see developed.

Of the resource options that we are looking at now, you've heard a lot already about Power Smart; therefore, I won't say anything more about that as it's everybody's favourite. (See Exhibit 5-39.) If Site C is on one end of the spectrum, Power Smart is on the other. We are doing, as Larry Bell said, the best we know how to do on Power Smart. We are not putting constraints on how much energy conservation we can acquire through incentives, through advertising, through cajoling manufacturers, whatever approach will work. Some accuse us of being timid about the numbers we have for Power Smart. These critics may be right. In some sense the potential is certainly larger; but, we are not at all timid about how we are going to go out and get it. That will be much more important to the actual results than anything we say about it in terms of planning or about studies.

Coordination refers to the coordinated development of our system with the Bonneville and the Alberta integrated systems. There are significant energy gains to be made here with very low or insignificant impacts and at very low cost.

Resource Smart, as you've heard, is doing things like putting new generators in existing dams or making small efficiency improvements throughout our system which, together, add up to a significant energy contribution.

Hydroelectric resources range from Roger Blagborne's 300 kW generator out near McBride, up to Site C and beyond. We still have about three quarters of the major hydroelectric potential of this Province undeveloped. At least half of that could be considered undevelopable; for instance, the Fraser and the Skeena because of the impact on the fisheries. But there's a quarter, in other words double what we've got now, which could potentially be developed.

Thermal: there are enormous coal deposits in the Province, literally hundreds of years of electrical generation potential. However, it's questionable how much, if any, would be environmentally acceptable for development.

Alternative technologies and emerging technologies we think of as being primarily opportunities in load displacement and diesel displacement in some of the remote districts, because of their relatively high cost. We are looking carefully at the contribution that some technologies can make, such as solar and wind. These issues are covered in more detail in both the "Electricity Plan" and the "Electrical Issues for the 1990s". These documents are available in the lobby.

I haven't mentioned cogeneration or IPP's which are simply variations on hydro, thermal or other resources. It's the institutional and cost framework that we are talking about when we talk about IPP's. An independent power producer will come to B.C. Hydro with a generation proposal to be fuelled by natural gas or coal or hydro. What they bring to the table are innovative technologies, or design practices or just experience in areas where B.C. Hydro has none, for example, the conversion of wood waste into electricity. The cogeneration facilities really require cooperative development, primarily by the forest industry. We are seeing some very encouraging results there.

If you turn to the second to last page of the "Electricity Plan" document that is in your package, you'll see this chart. (See Exhibit 5-40.) What it represents is B.C. Hydro's evaluation of resource options. When I say B.C. Hydro I am referring to an internal assessment based on our estimate of costs, technological availability, customer acceptance, and so on. Others may differ with our relative ranking of these resources. In fact, we would invite you to do your own ranking on it. It reflects qualitative judgements represented numerically. The rankings go from insignificant up to very significant, from 0 to 4. We've done a simple program to get the total weighting score in the last column. This is something we will develop and may present at future workshops to get other values on the same topics.

The issue of when and how much to develop in the 1990s is represented in this last picture, and in more detail in the last chart from the "Electricity Plan" document. (See Exhibit 5-41.) I won't go through this in detail, but you can see that the growth that we are looking at is of the order of 2.5 percent to 2.7 percent per annum over the 20-year period. The dotted line represents the gross increase in demand. The differential between the dotted and the solid line is what we expect from customer self-generation and Power Smart. In other words, a significant contribution from those two sources which, as I've already said, could increase if we are more successful than anticipated. The cross-hatched areas are the resource additions. By the middle of the 1990s, the purchase contract from Alcan makes a significant contribution and, at the end of the decade, perhaps the return of the downstream benefits. We've included that to show what contribution it could make to B.C. Hydro's loads; however, they are a provincial resource and will be allocated by the Province.

Beyond the year 2000, those bar charts represent the completion of the Columbia River - Keenleyside, Murphy Creek, possibly Border - and some smaller developments, and includes Site C. The timing of resource additions from 2005-2020 is highly uncertain. The longer the lead time to develop a resource the more difficult it is to decide where to invest dollars and effort in studies. These resources, especially the major hydro, are not such that construction could begin tomorrow. It's not only the environmental impact assessment that has to be done, but also, the very costly and time-consuming process of collecting field data and then doing the engineering designs. If those resources are going to be brought on line for the period beyond 2005, there will have to be some money spent on them in the next few years. Now clearly, B.C. Hydro does not want to be in the position of spending money on a resource that has a very low probability of being developed. That's one of the reasons we wrote off the investment in Hat Creek, and why we aren't spending any money on nuclear power at this time. But, soon we will have to face the issue of to how to make sure we have enough electricity for the period beyond 2005.

The next chart is a generic or schematic representation of the risk problem of bringing on a major new resource. (See Exhibit 5-42.) I picked the years 2000-2005 because that's the most likely timing of having to bring something like a Site C on line. In terms of economic studies it doesn't make much difference what year it comes on stream in that time frame. It could go a little earlier or a little later and, based on today's projections, the cost to the consumer will be about the same. If you bring it in early, you have the risk of oversupply i.e., having too much electricity. That's what happened when we brought Revelstoke on in 1984; it was all surplus electricity. We were able to sell it in the export market. We were also able to market it to industrial customers in the Province; therefore the net financial impact was minimized. This was a surprising result when you consider that it was 25 percent of our total system capability at the time, and we were able to avoid spilling water. If the project for the year 2000 is a Site C, it will be about ten percent of our capability, and in my view, much more manageable in terms of what could be done if we ended up on a lower growth path and yet were committed to the project.

The other side of the picture to the right of the graph is the undersupply cost side. What happens if you don't have enough energy? This is an area that probably would cause more controversy than the oversupply area because it really comes down to what the Province values in terms of economic growth and energy availability. Some might say that undersupply would be the best thing that could happen because it would force us to conserve. I don't think that is the prevailing view in terms of people who are looking for employment and is not the prevailing view of the government of today. That is not to say that we can't change as a society; but the risk on that side is that new plants that would make more efficient utilization of our forest resources, like the CTMP mills, would have to be deferred, or we would have to say to new residential customers, you can't get your hook-up this year. I'd like you to keep that picture in your mind to give you a feeling of what we are trying to manage and what the costs are on both sides.

Let me turn to some of the issues that affect another major decision problem that we have. One issue is the serving of load in various parts of the province. Here you have the current regional generation and demand picture. (See Exhibit 5-43.) Most of our generation is remote from the demand. Southern Vancouver Island and the coastal areas around Vancouver have most of the demand and little of the generation. Up around the Peace and Columbia areas, it's just the reverse - small demand and a large component of the generation. That means transmission lines to get the power to the loads. The alternative is conservation or load displacement in the areas where that load is located. Obviously this tells us that if we are going to focus our conservation and load displacement programs they ought to be in the Lower Mainland area because you get a double effect there. You have the effect of reducing the requirement both for new generation and for new transmission. However, there aren't any easy solutions on the horizon, particularly when our pricing policy doesn't reflect this picture. That is, we have a postage stamp pricing policy wherein everybody pays the same energy and demand charges everywhere on the integrated system. The cost, however, of getting electricity from the generation to the load varies significantly by region. We think that this is going to impact most severely in the Lower Mainland area in the coming 10 years or so. We are looking at new corridors. Exhibit 5-44 illustrates the existing transmission corridors that run along the Fraser Valley. We'll have to beef up the system by current projections in the late 1990s by a new line running from Kelly Lake to Cheekye. This is the line through Whistler that Mr. Bell referred to earlier. Beyond the year 2000, unless we are much more successful than we currently project at reducing load in the Lower Mainland, we'll have to find new corridors. My personal view is that this is going to make Site C look like a very minor issue indeed, because where there are heavily built up corridors we have to deal with concerns over potential health problems from electrical and magnetic fields. I think these issues are going to be judged on a very tough scale in the late 1990s and early 2000s. This again is another strong incentive for all of us, especially those of us who are living in the Lower Mainland, to be as efficient as possible.

Well that pretty much comes to the end of the remarks I had to make about our plans. It's not a big change from last year's plan; but we can report higher expectations for Power Smart, a significantly higher outlook for self-generation load displacement and a continued reassessment of the role of major hydroelectric projects. Innovative Resource Smart contributions are coming from our engineers in System Development who are saying, "We're as smart as the guys working on Power Smart, let's show what we can do on this side as well!" We've had a significant increase in the contribution because of that attitude.

Last year at the Forum we said we would get out and talk to as many people as were interested in hearing from us. We had quite a few requests. We've sent out about 5000 reports, 1200 of our big documents, and some 3700 of mini-versions that you've got in your package. (See Exhibit 5-45.) We made presentations to over forty different groups, the majority of them in the northern half of the

Province. We intend to continue to do these presentations this year. We are looking for effective mechanisms for getting public feedback. Obviously, there are many interest groups with specific axes to grind that will take up all of our time telling us about what their particular desires are. It's a little tougher to find out what the broad range of opinion is. We've got a questionnaire that I would really appreciate you filling out. (See Exhibit 4-46.) It asks your views on what you think about public input and feedback into our planning process, both in determining the need, and in evaluating different resources and the timing of them. So give us your opinions. The opinions will probably vary all over the map. Should we use random sampling or advisory groups, or just get out on the road and talk to people who will listen? We need feedback from you on this.

I am going to give you an indication of what we are going to be doing in the next couple of years. Chris Boatman mentioned our Planning Committee. One of the first things we did was decide that doing 20-year long range plans every year didn't make a lot of sense. We had to be able to make the plan last a little longer than just a year. We are looking for a two-year shelf-life on our plans now. Our next major revision will be in 1992. We will have an update next year, at next year's Forum; but for the 1992 revision we want to focus in more depth on some of those long range issues and, in terms of getting public feedback, on what their views and values are.

Our role as a utility is not quite what my friend Irving Fox indicated this morning. We are not the policy lever to drive lifestyle choices in the Province, but I do agree with him that it is our responsibility to put the choices out there, and to discuss with people the implications of those choices.

I also agree with Hazel Henderson that one of our major tasks here is to try to extend the value system, that is, the way we measure what people value. We should try to get feedback on that; but as far as I can tell there aren't any easy answers here either. I think Tim McDaniels is right when he said that we face difficult decisions, and some tough trade-offs. Our role, I believe, is to elucidate those trade-offs as clearly as we can, and to help others, including the general public, understand these tradeoffs.

So the final thing I will leave you with is that we are behind Power Smart and lifestyle changes all the way; but we are also watching the load curve. Thanks very much.

Thanks from Chris Boatman

Thank you very much Ken.

Question to Ken Peterson

Question

I have one question here. A gentleman who wants to know: "What proportion of Hydro's generated power, from all our facilities, is lost during transmission?"

Ken Peterson

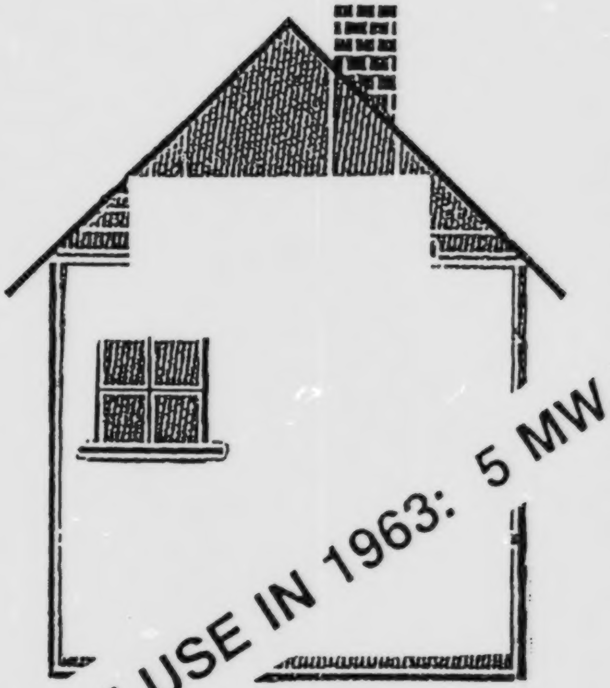
The total system losses are about 13 percent, that includes transmission and distribution. The bulk of the loss occurs actually at the distribution level. That would be about seven percent. The major transmission loss is, I think, something under five percent.

Exhibit 5-32

RESIDENTIAL USE

1960

- RANGE
- FRIDGE
- CLOTHES WASHER
- HI-FI
- TELEVISION - Black & White
- SMALL ELECTRICALS
  - Toaster, Kettle,
  - Clothes Iron, Vaccuum



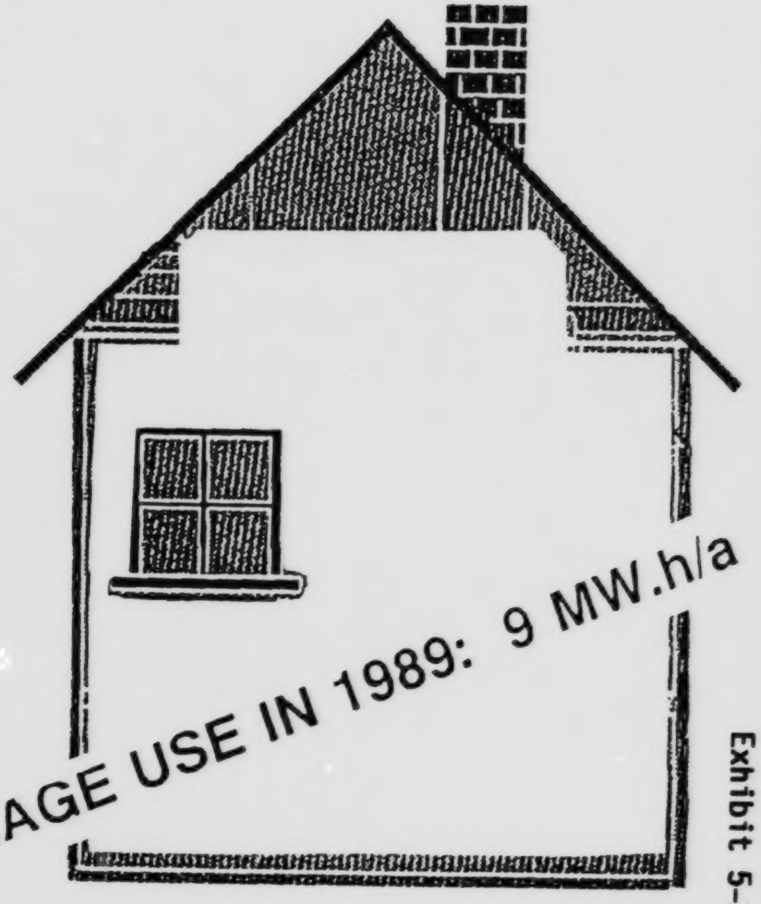
AVERAGE USE IN 1963: 5 MW.h/a

Exhibit 5-33

RESIDENTIAL USE

1990

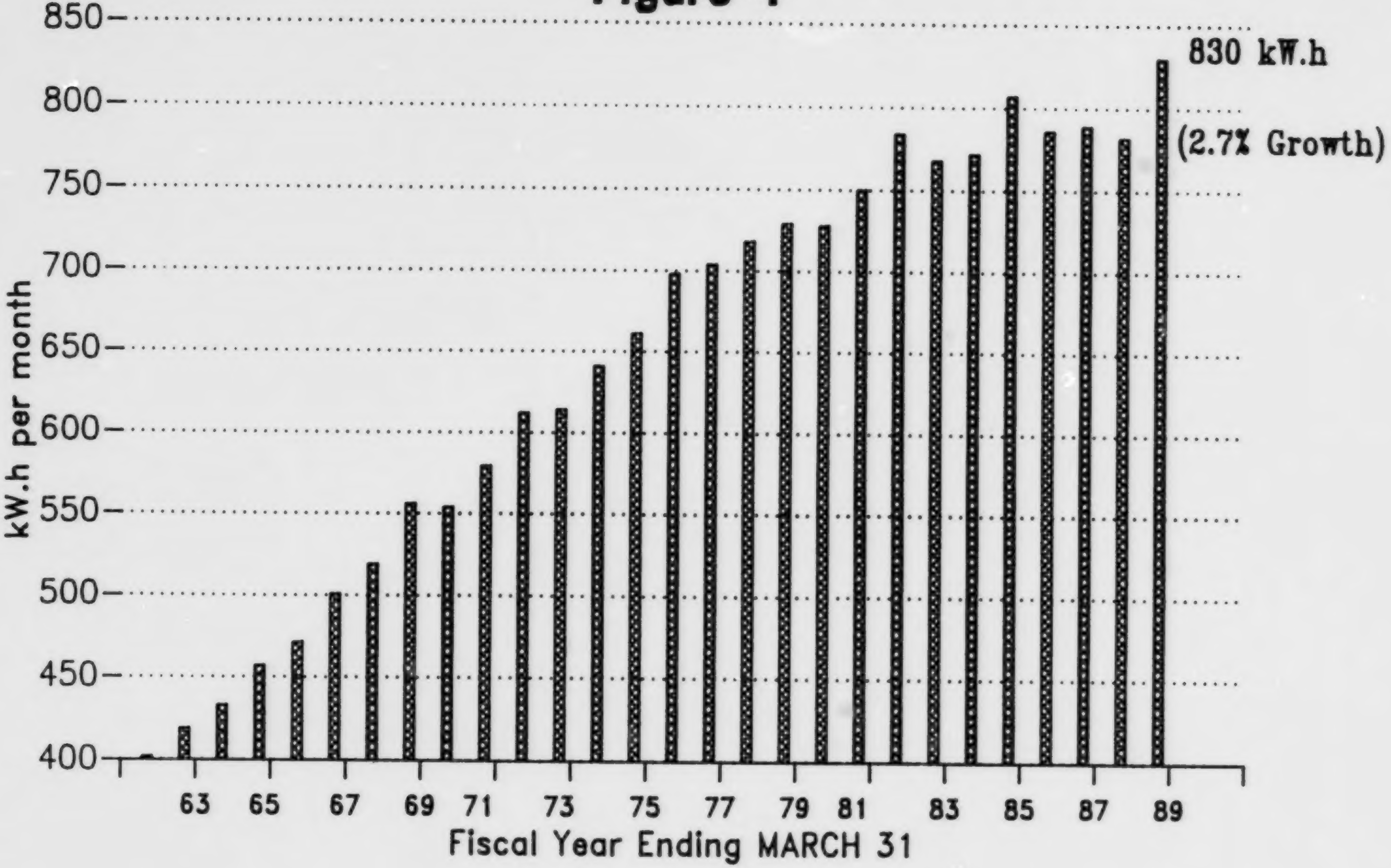
- RANGE (with Self Cleaning Oven)
- MICROWAVE
- FRIDGE (with Ice Maker)
- FREEZER
- CLOTHES WASHER & DRYER
- PERSONAL COMPUTER, PRINTER
- STEREO, AMPLIFIER, CD
- TELEVISION - Colour, Stereo
- SMALL ELECTRICALS
  - Toaster, Kettle, Food Processor
  - Blender, Knife, Coffee Maker/Grinder
  - Clothes Iron, Vaccuum, Hair Dryer/Curling Iron
  - Garden Tools
- SAUNAS, HOT TUBS



AVERAGE USE IN 1989: 9 MW.h/a

Exhibit 5-34

AVERAGE USE PER RESIDENTIAL ACCOUNT
KW.H PER MONTH
Figure 4

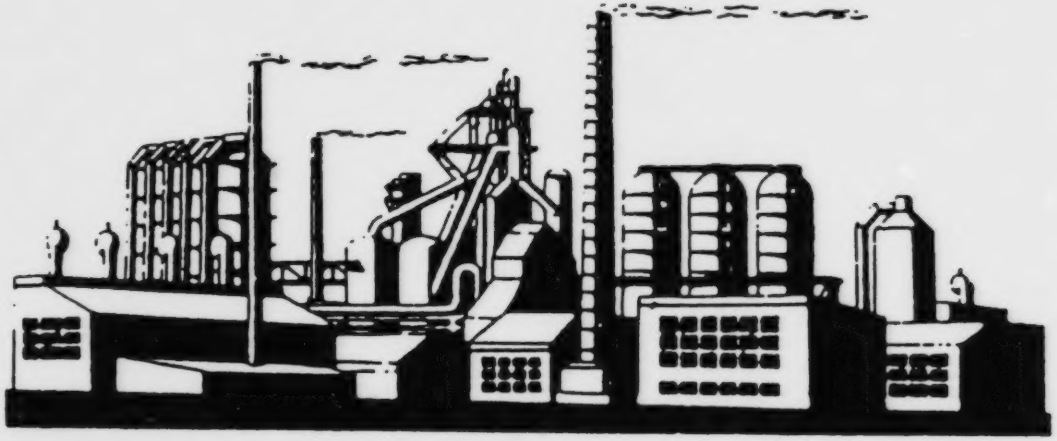


27 NOV 1989 12:00 PM BY DB3

PRODUCED BY GDDM-CSPF

Exhibit 5-35

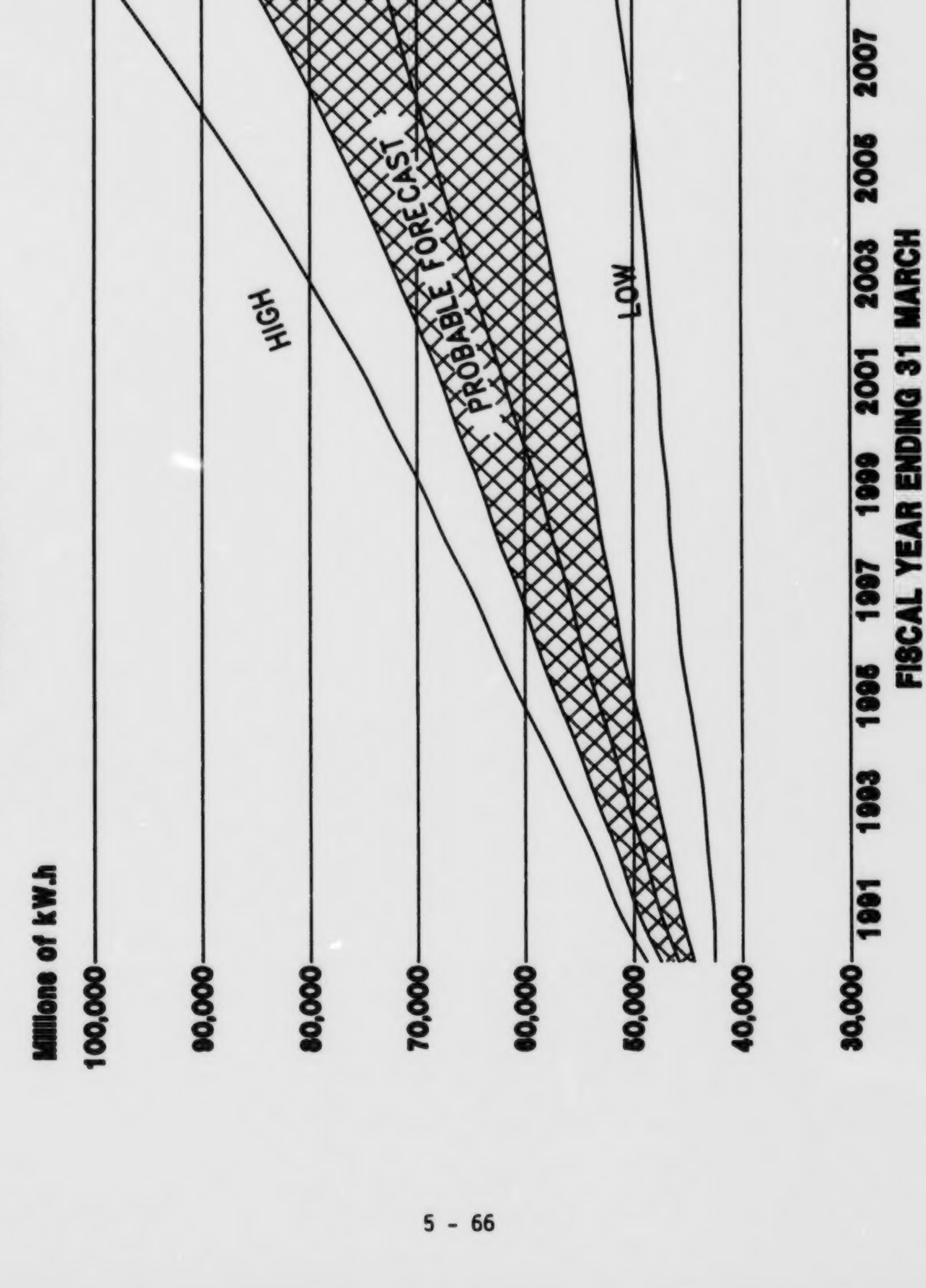
INDUSTRIAL USE



OPERATION	POWER REQUIREMENTS (megawatts)
THERMOMECHANICAL PULP (TMP, CTMP)	40 - 60
NEWSPRINT, GROUNDWOOD PUBLICATIONS PAPER	45
BLEACHED KRAFT PULP (BKP)	5

Exhibit 5-36

DEMAND OUTLOOK



29 MAY 1990 3:31 PM BY DB3

PRODUCED BY GDDM-CSPF

Demand/Supply Uncertainty

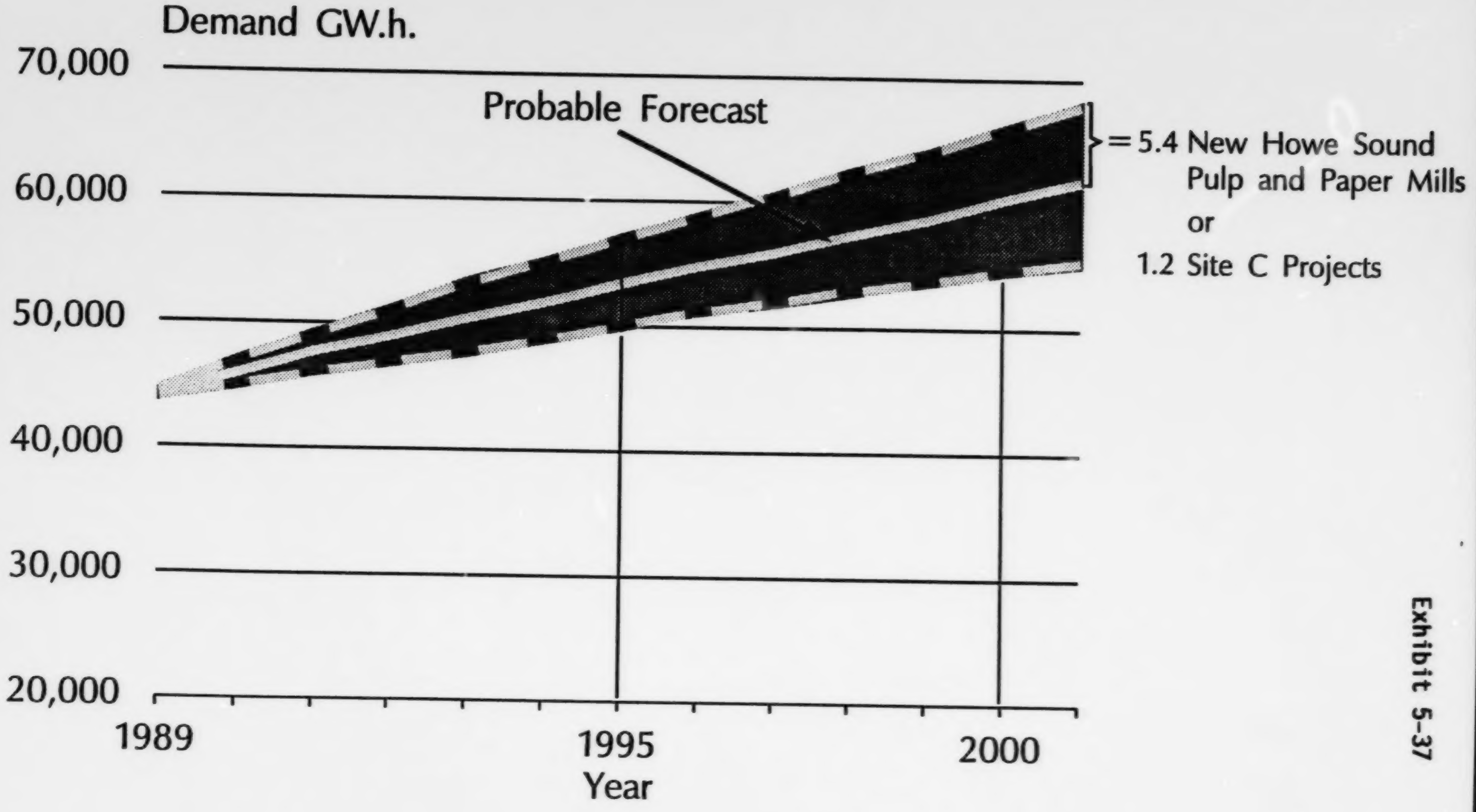


Exhibit 5–37

HYD 35 03

Resource Additions in the 1980's

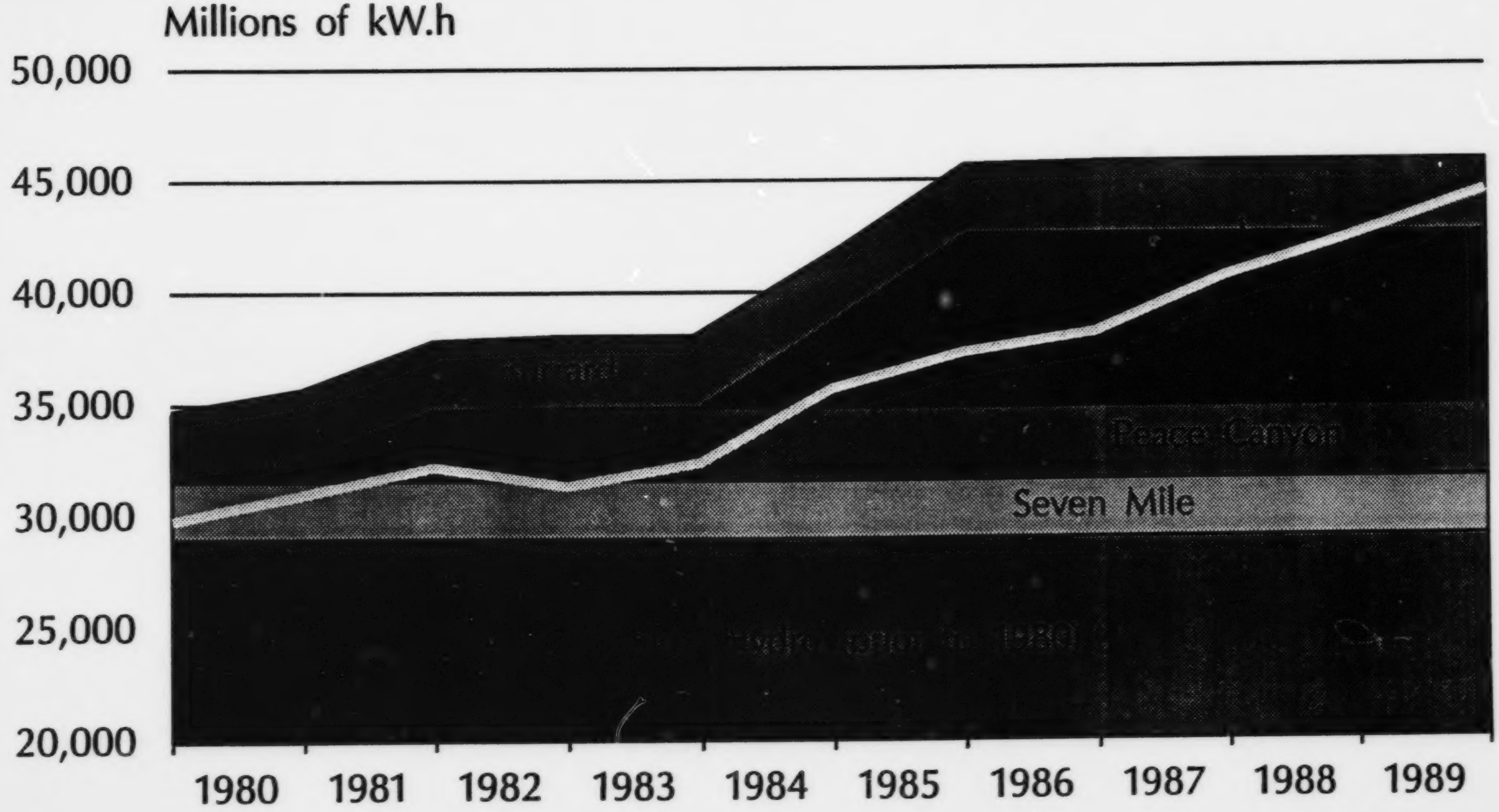


Exhibit 5-38

HYD 35 01

Exhibit 5-39

** RESOURCE OPTIONS **

- ° POWER SMART
- ° COORDINATION
- ° RESOURCE SMART
- ° HYDRO
- ° THERMAL
- ° ALTERNATIVE TECHNOLOGIES
- ° EMERGING TECHNOLOGIES

EXHIBIT 5-40

° *Second to last page of the Introductory 1990 Electricity Plan*

EXHIBIT 1
ASSESSMENT OF OPTIONS

	Availability	Public Acceptance	Cost	Uncertainty	Environmental Impact	Socio-Economic Impact	Transmission Impact	Weighted Sum
Weight[1]	NA	20	15	5	15	5	10	
Power Smart	1	0	1	2	0	0	0	25
Coordination	1	1	1	1	1	2	2	85
Resource Smart	1	1	2	1	1	2	2	100
Hydro								
Small developments	1	1	2	2	1	2	2	105
Peace/Columbia	1	2	2	1	2	3	3	150
Undeveloped Basins	1	2	2	2	3	2	3	165
Thermal								
Coal	1	3	2	1	3	1	3	175
Gas	1	2	2	3	2	1	1	130
Nuclear	1	4	2	2	2	3	1	175
Woodwaste	1	1	2	2	1	1	3	110
Alternative Technologies[2,3]								
Wind	2	2	4	3	2	1	3	180
Geothermal	2	2	4	3	2	2	3	185
Tidal	1	2	4	3	3	2	3	200
Municipal Solid Waste	1	2	3	2	2	1	1	140
Emerging Technologies[2,3]								
Fuel Cells	3	2	3	2	1	1	1	125
Fusion	4	2	3	3	1	3	1	140
Wave	3	2	3	3	2	1	3	165
Solar	3	2	4	3	2	1	1	160

1. Impacts are ranked on a scale of 0-4. Smaller numbers indicate greater availability, and public acceptance, lower cost, less uncertainty and less impact. The weights reflect Hydro's current judgements and will be adjusted to reflect changing values. Others may differ in the relative values they place on these impacts.
2. Only large scale developments are considered. The impacts of these resources may be quite different for small scale developments.
3. Ongoing monitoring of experience around the world is maintained. Certain demonstration projects may be approved.

Exhibit 5-41

DEMAND FORECAST INCREASES AND RESOURCE ADDITIONS

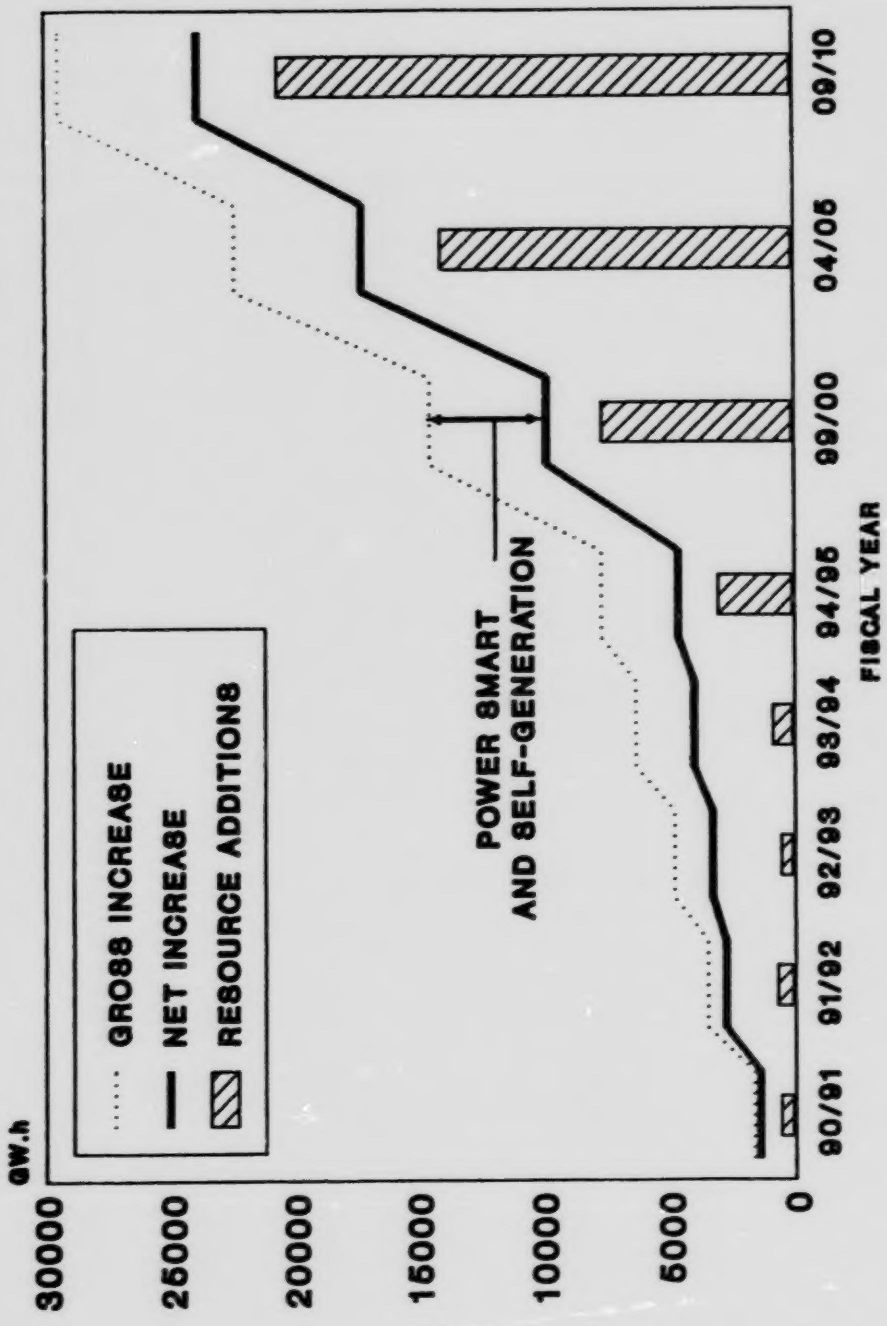


Exhibit 5-42

OVER/UNDER SUPPLY RISKS

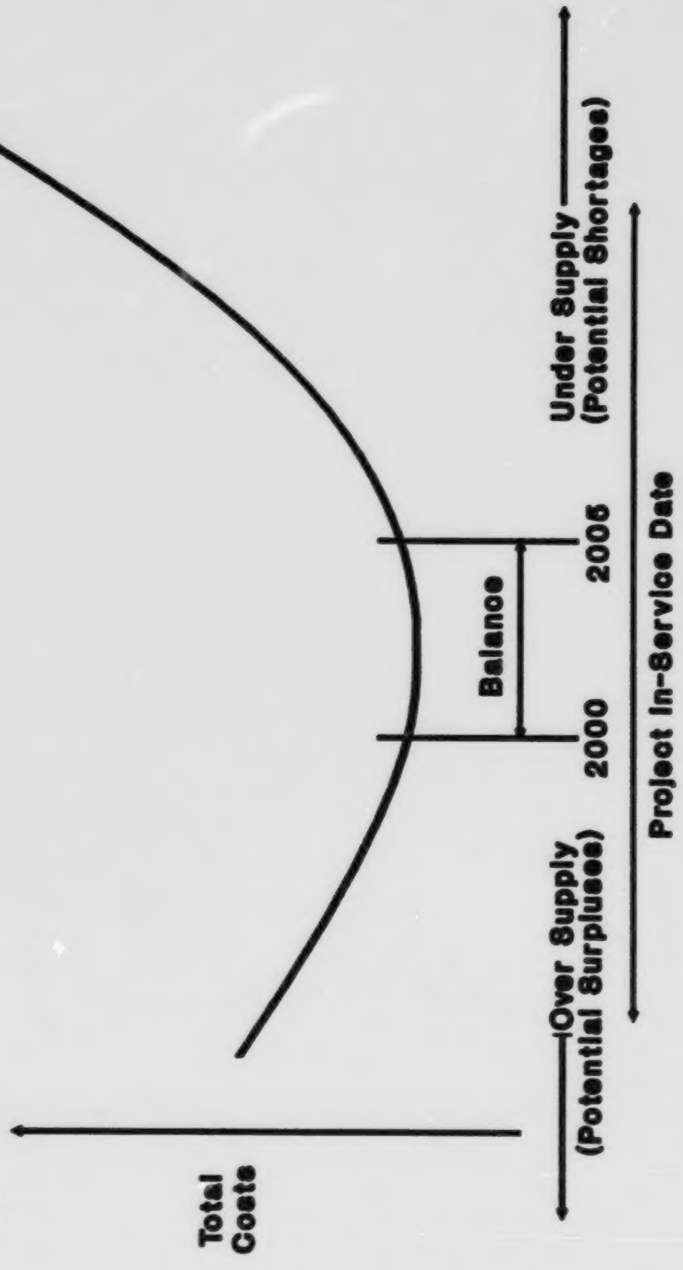


Exhibit 5-43

B.C. HYDRO
CURRENT REGIONAL
GENERATION-DEMAND
BALANCE

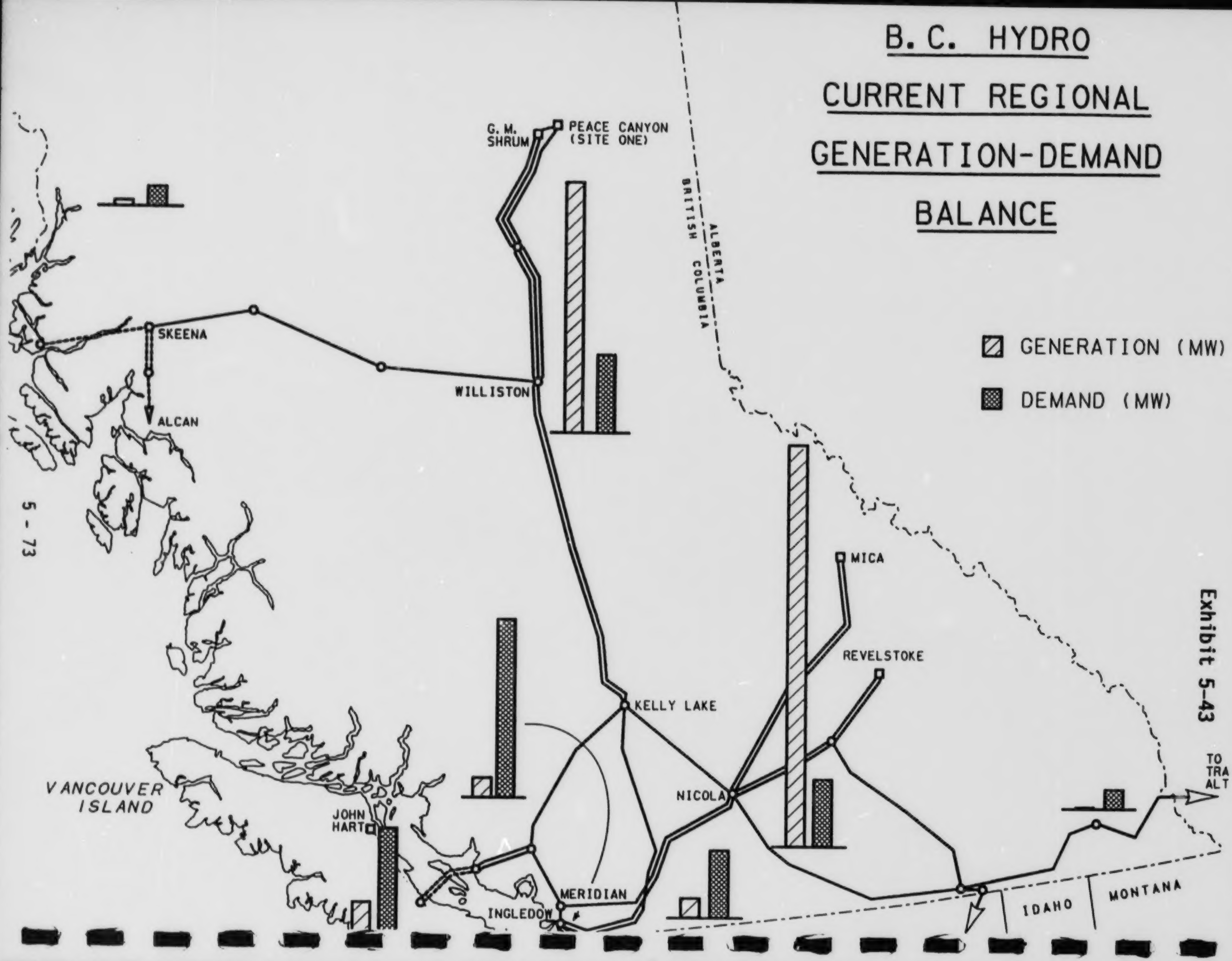

▨ GENERATION (MW)
▩ DEMAND (MW)
PEACE CANYON (SITE ONE)
G.M. SHRUM
ALBERTA
BRITISH COLUMBIA
SKEENA
ALCAN
WILLISTON
MICA
REVELSTOKE
KELLY LAKE
NICOLA
VANCOUVER ISLAND
JOHN HART
MERIDIAN
INGLEDOW
IDAHO
MONTANA
TO TRA ALT

Exhibit 5-44

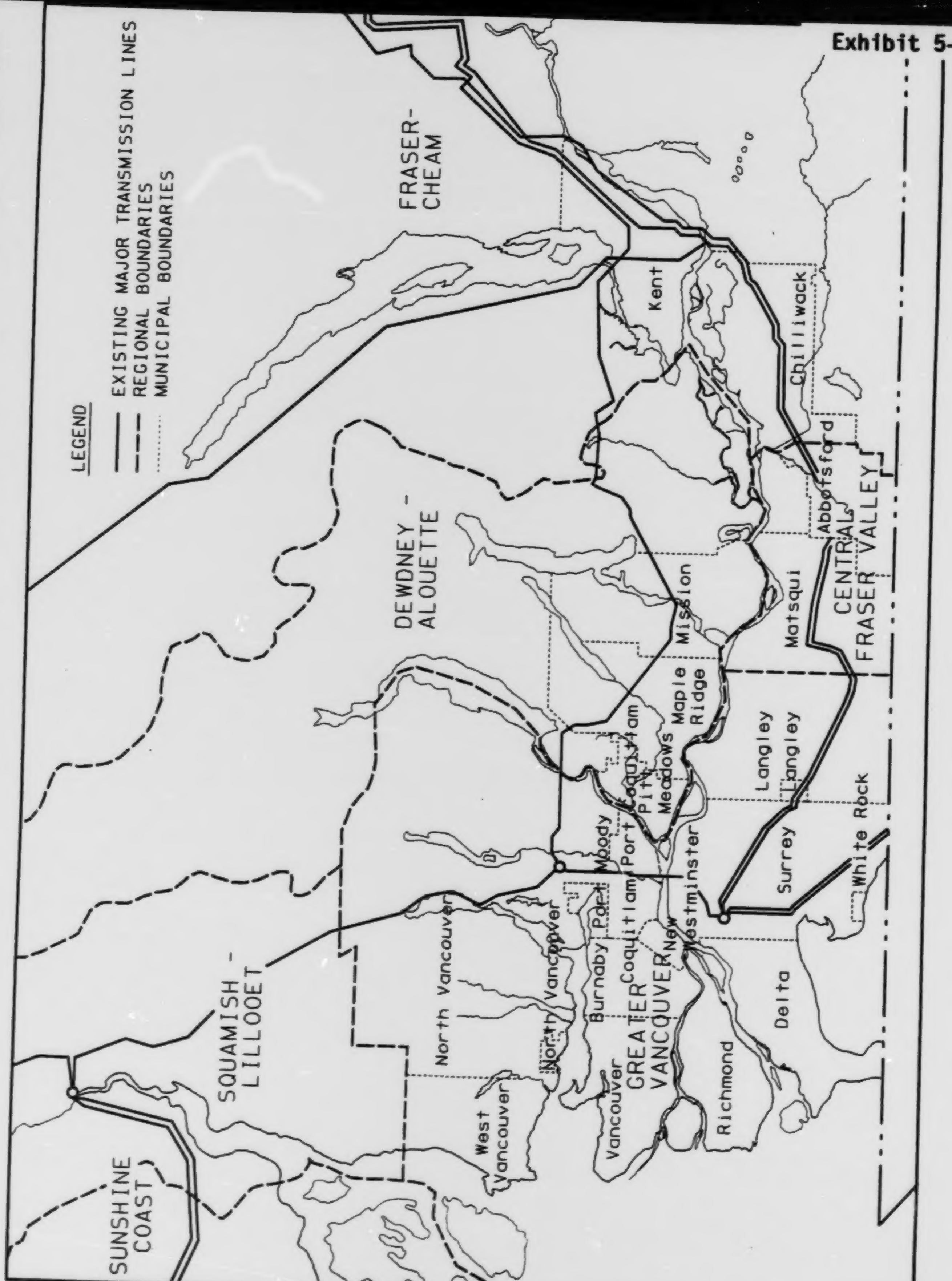

LEGEND
EXISTING MAJOR TRANSMISSION LINES
REGIONAL BOUNDARIES
MUNICIPAL BOUNDARIES
FRASER-CHEAM
DEWDNEY - ALOUETTE
SQUAMISH - LILLOOET
SUNSHINE COAST
GREATER VANCOUVER
CENTRAL FRASER VALLEY
Kent
Chilliwack
Abbotsford
Matsqui
Mission
Maple Ridge
Pitt Meadows
Coquitlam
Port Coquitlam
Port Moody
Langley
Langley
Surrey
White Rock
New Westminster
Burnaby
North Vancouver
North Vancouver
West Vancouver
Vancouver
Richmond
Delta

Exhibit 5-45

1989 TWENTY YEAR RESOURCE PLAN

CIRCULATION

- 1200 REPORTS DISTRIBUTED
- 3700 INTRODUCTORY REPORTS DISTRIBUTED
- OVER FORTY PERSONAL PRESENTATIONS
- 65 PERCENT OF THE PRESENTATIONS WERE MADE IN THE NORTHERN REGION

Exhibit 5-46
Page 1 of 4.

B.C. HYDRO'S ELECTRICITY PLANNING QUESTIONNAIRE

By your attendance at the Third Annual Energy Forum this week, you have shown us some of your interest in electricity issues. As well, we would like to take this opportunity to gather your views on the needs and opportunities for involving the public in electricity planning in British Columbia.

Please complete the attached questionnaire and leave it at the conference registration desk before 4:00 p.m., Tuesday, 6 May 1990. Otherwise you may mail the completed questionnaire and any other comments that you may have to:

External Relations Department
B.C. Hydro
19th Floor, 970 Burrard Street
Vancouver, B.C.
V6Z 1Y3

Attachment

Exhibit 5-46
Page 2 of 4.

B.C. HYDRO'S ELECTRICITY PLANNING

1. B.C. Hydro needs to know where and how the public wants to be involved in the electricity planning process. Key activities which involve extensive information gathering are likely candidates for expansion of planning scope to include a wider range of inputs. One such area is forecast estimation of electricity demand. Please tell us how important it is for you to be involved with, and informed about forecast estimation at B.C. Hydro.

Informed about forecast estimation:	1 Least Important	2	3	4	5 Most Important
Involved in forecast estimation:	1 Least Important	2	3	4	5 Most Important

2. The development of the demand forecast is based on economic and engineering practices. The forecast may be very statistically and theoretically sound but the corresponding implications for growth and the necessity for the development of new resources to meet that growth must be understood by British Columbians. Please tell us how important it is for you to be involved with, and informed about assessment of the need for the development of additional sources of electricity.

Informed about need assessment:	1 Least Important	2	3	4	5 Most Important
Involved in need assessment:	1 Least Important	2	3	4	5 Most Important

3. Another area for public involvement involves the coordination and incorporation of information about options available to provide the electricity to meet the forecast demand growth. As the list of options is compiled, we may need an expanded audience to review all options. Please tell us how important it is for you to be involved with, and informed about the options available to provide electricity in the future.

Informed about review of options:	1 Least Important	2	3	4	5 Most Important
Involved in review of options:	1 Least Important	2	3	4	5 Most Important

Exhibit 5-46
Page 3 of 4.

B.C. HYDRO'S ELECTRICITY PLANNING

4. Choose your preferred three methods of being INFORMED. Please number choices.

Newsletter ____ Newspaper ____ Mail ____

Summary ____ Detailed Report ____

Presentation ____ Toll Free Call In ____

Other (Please specify) ____________________

5. Choose your preferred three methods of being INVOLVED. Please number choices.

- Correspondence ____
- Attendance at Presentation ____
- Public Meetings ____
- Open Line (Phone In) ____
- Open House Session in your community ____
- Advisory Committee
    - Personal Participation ____
    - Represented by Other ____
    - Other (please specify) ____
- Other ____________________

6. In your opinion, informing and involving others in electricity planning should focus on:

- representation by economic activity (i.e. industries, businesses, services, and residential sector)

1	2	3	4	5
Strongly Disagree		Agree		Strongly Agree

- the entire provincial electricity picture

1	2	3	4	5
Strongly Disagree		Agree		Strongly Agree

- a regional approach to concerns and representation

1	2	3	4	5
Strongly Disagree		Agree		Strongly Agree

B.C. HYDRO'S ELECTRICITY PLANNING

- only planning for provision of electricity, and be done independently of other issues such as pricing, rate structure, project implementation.

1	2	3	4	5
Strongly Disagree		Agree		Strongly Agree

7. Not including the time spent at this Forum, I would be willing to invest _____ hours over the next year to become informed/involved in electricity planning with B.C. Hydro.

8. Please add any comments you have on public involvement and planning for electricity for the future.

____

____

____

____

Thank you for completing this questionnaire and your comments. Can we include you on our mailing list for electricity planning information?

NAME: ______________________________________

ADDRESS: ______________________________________

____

____

POSTAL CODE: __________

Introduction of Speaker, Dr. Zig Hathorn

Chris Boatman
Conference Chairman
B.C. Hydro

Introduction of Speaker, Dr. Zig Hathorn by Chris Boatman

Our last speaker of the afternoon is Zig Hathorn, who is going to talk to us about environmental protection in B.C. Hydro. Zig is Manager of our Environmental Resources Department at B.C. Hydro, having joined the Environmental Services Section in 1975 coming from Ontario Hydro. Dr. Hathorn obtained his Ph.D. from Cambridge University in Physical Chemistry and subsequently joined the Chemistry Department at U.B.C. before becoming a research associate in electrical engineering. He has a wide experience in all aspects of environmental protection having worked on many types of projects while at B.C. Hydro. Please welcome Dr. Zig Hathorn.

Environmental Protection

Dr. Zig Hathorn
Manager, Environmental Resources
B.C. Hydro

Environmental Protection by Dr. Zig Hathorn

Ladies and gentlemen: Two definitions. The Environment: the water, air and land, which are essential to life; and the social, cultural and economic resources, many of which are intangible, but which nevertheless add value to that life, and which are highly prized by society. Protection: the act of preventing injury or destruction. If we couple these definitions with some additional concepts, such as firstly, "I am, therefore I pollute". Secondly, the need, as Tim McDaniels has made clear, to maintain our stock of environmental capital. And thirdly, the value that society very clearly places on energy, particularly electrical energy and their parallel concern for the environment. Then we get an inkling of the challenge that we at B.C. Hydro face as we go about our business of generating and distributing electricity to the people of British Columbia.

What I'd like to do is to provide an overview of how we are reacting to this challenge, how we provide electricity to British Columbians and at the same time play our part in protecting the environment. Now at the outset, I'd just like to note that the concept of environmental protection at B.C. Hydro is not a new one. Ever since I've been there I can recall it being a part of our corporate thinking. What is new is the emphasis that it is now being given. There is no doubt that consideration of the environment has become a part of our corporate ethic and a component of our corporate lifestyle. Nowhere is this more eloquently described than by the Environmental Resolution that was passed by our Board of Directors and the Environmental Principles which accompany it. (See Exhibit 5-47.)

I am not going to lead you through these principles one by one; but what I will do is use the Principles, illustrated with specific examples, to describe the way in which we are going about this business of protecting the environment. Environmental protection means different things to different people, so certainly it is a multi-faceted issue. So to try and provide some structure to this talk I've divided it into three essential elements. A strategic component, an implementation component (the nuts and bolts of it) and a tactical component. (See Exhibit 5-48.)

Dealing first of all with the strategic side of it, where our Principles numbers 2 and 3 provide the basic direction. (See Exhibit 5-49.) The principles "2" and "3" are that we will "promote a balance between resource use and conservation in providing B.C.'s energy needs" and "we will utilize presently developed resources to achieve optimum efficiency before developing new energy sources". This obviously is the basic direction of our management of supply and demand, something which has been talked about at great length today. Certainly, if we are going to maintain our stock of environmental capital we are going to have to manage very efficiently both sides of this equation. I think the goal here is quite simple: We wish to defer for as long as possible the need for the next project.

Now at the risk of overdoing it, I also want to talk a little more about the Power Smart and Resource Smart programs which the demand side and supply side represent. (See Exhibit 5-50.) Although we on the environmental side are perhaps not as keenly involved in these programs, we nevertheless identify very strongly with them. On the demand side, I won't go through all those examples; but pick up the one that has not been mentioned yet, and that is improvements to air compressor systems. One industry, which uses compressed air to drive a multiplicity of instruments in their plant, went through a check up. Leaks were found and were sealed. This simple improvement saved approximately two million kW·h of electricity annually, a saving of $80,000 a year. Clearly what's good for the environment is good for business as well.

On the Resource Smart side, we have examined our own operations. (See Exhibit 5-50.) I'll just dwell on the Revelstoke tailrace where by reducing the elevation of the river downstream of the plant we were able to increase the head on that plant slightly and provide for an additional two percent energy production from that facility.

That's the strategic component of our environmental protection effort.

Moving to the implementation side, the Principles that guide us here are numbers "1", "4" and "5". (See Exhibit 5-51.) They are that "we will include consideration of the full range of natural and social environmental impacts in all of B.C. Hydro's actions from initial planning and operations to decommissioning and disposal", "we will pursue opportunities to replace in-kind natural or social resources affected by B.C. Hydro's actions", and "we will promote appropriate recreational and commercial use of B.C. Hydro's reservoirs, rights-of-way and other properties".

There are essentially three sides to B.C. Hydro's business where direct interaction with environmental resources is most apparent. They are in new project development, in construction and in the operating areas. Dealing first of all with new project development, as our number "1" Principle indicates, any and all new projects will be subjected to a detailed environmental evaluation to determine what their impacts are. (See Exhibit 5-52.) The goal here is to document and understand the implications of any actions that we take. In this process we seek to minimize the impacts and maximize the benefits that will accrue. Where losses do occur, we will seek as principle number "4" suggests, to compensate for those losses in kind. I'd like to dwell on this last point just a little bit because, while it does acknowledge that in some cases we will have some adverse impacts, it also establishes a very important principle. This principle is that we will strive to replace those losses in kind. I think Ed John raised the desirability of this earlier on today.

Two examples come to mind. On Williston Reservoir, to the north of us, we have established a $10 million fund to sustain and enhance the fish and wildlife resources that were affected by the installation of Williston Lake. This is a long term program. I think we have been struck many times today with the concept that economics is essentially a short term concept, and the environment is a long term concept. This fund is intended to be a long term fund to assist in resource maintenance. We intend to use this type of model on any new projects that come forward. Indeed, we are looking at some of the older projects to see if this concept of a fund would not apply to them as well. The concept applies also to my second example, the Puntledge River, where we are working with the Federal, Provincial and local interest groups in an attempt to re-establish the once famous salmon runs on that river. We tried last year with submerged hammers, giant noise-makers if you wish, in an attempt to startle the fish away from the water intakes. This was not successful so we are trying different techniques this year. Even though we did not succeed initially, we are not discouraged. We intend to succeed and setbacks have merely served to strengthen our resolve in this respect.

The second side of our operation is the construction side. (See Exhibit 5-53.) By this I am not just referring to large projects; for in reality they come through few and far between. I am referring also to the wide range of plant maintenance and modifications, and service additions that take place. These are the real nuts and bolts of it. These are the bulldozers working near rivers, petroleum product management, erosion control and reclamation. As with all projects we attempt to understand the implications of that work and to explore all of the linkages involved, so that we can establish protection measures to minimize impacts. These protection measures are included in specifications and contracts. We prepare contingency plans to deal with emergencies, and we have environmental monitors who ensure that these programs are carried out, and deal with day-to-day activities.

The final part of our implementation strategy is working with Operations. (See Exhibit 5-54.) These are the Customer Services and Production groups that operate our dams, our transmission lines, and our distribution systems to the customer. There are a wide range of examples that we can pick here and I've selected four.

PCB's, polychlorinated biphenyls, are long-lived, stable, organo-chlorine synthetic oils that show a number of very useful properties from an electrical industry point of view. However they also show some very disquieting properties from an environmental perspective and we are therefore in the process of phasing them out of our in-service equipment. In some cases we are able to destroy the PCB itself. For example, trace quantities in insulating oils can be destroyed and the oils cleaned up and returned to service. To-date, we have processed approximately three million litres of insulating oil using a patented method that was developed at B.C. Hydro. For other PCB wastes, we are not quite so fortunate and no such destruction facilities are presently available in B.C. and this material must now be stored pending the arrival of such equipment. And we are taking significant pains to ensure that the storage of that material is carried out in a secure and responsible fashion.

Our reservoirs: We have a progressive program for the removal of wood debris from those reservoirs with the goal of both enhancing the aesthetic characteristics and also contributing to their functional multiple use. And speaking of multiple use, 35 of our reservoirs, province-wide, have at least some form of recreational facility on them. And this supports about 1.5 million user-days in terms of recreation. B.C. Hydro operates a number of recreation areas and about half a million people per year visit them. We have a recreation initiatives program sponsored by our board of directors which is encouraging local groups to develop their own recreation facilities in cooperation with B.C. Hydro. And an example of that is in Valemount, just down the way, where the local marina association is in the process of putting in a boat launch ramp with B.C. Hydro's assistance.

Finally vegetation management. We have approximately 55 000 km of transmission line rights-of-way in B.C. And we are increasingly using the competition between plant species to control tall fast-growing trees that could pose a hazard to transmission lines. The goal here is to reduce our reliance on herbicides and we are continually looking for ways of doing that.

So that then deals with both the strategic and implementation components of environmental protection at B.C. Hydro.

I'd like to now come to our final component the tactical side of it where Principle numbers "7" and "8" give us the lead. "We will become a corporate leader in furthering awareness of local, provincial and global energy issues and actively participate in actions to deal with those issues". (See Exhibit 5-55.) "We will work with industry, government, public and other institutions to create and maintain a safe environment through a cooperative approach that shares information, knowledge and experience". This tactical component is the one which I think is critical to the success of any environmental protection effort that we embark on at B.C. Hydro.

Clearly, in the final analysis it is going to be people who make this thing work; therefore, we must direct considerable effort, both internally and externally, in this regard.

Last Friday, our Environmental Awareness Program was inaugurated. (See Exhibit 5-56.) This internal program is directed at our employees. We are seeking to provide a two-way communication between our employees and those of us who work in the environmental field. The goal is clearly to establish an enhanced awareness of environmental issues, but more than that, it is to provide factual information that will enhance the understanding of environmental issues. It's all very well to say "thou shalt not"; however, I think it's much more important to understand why "thou shalt not". Indeed only then you can contribute to it and meet the fourth objective to this Program to identify ways in which we can improve our environmental performance.

Externally, we certainly recognize the role of the public. For it is they who are going to judge our environmental performance in the long run. Through our public consultation programs we are very actively discussing this with the public what their role and responsibilities in energy use are, and to obtain a very clear indication from them of what their expectations of us are. So in the final analysis, if we are to be judged then we must be judged by an informed public. Thank you.

Questions Directed to Dr. Hathorn

Chris Boatman

Zig, I do have a couple of questions. First of all: When do you expect the equipment to arrive that will be able to clean up the PCB's in the stored insulating oils?

Dr. Hathorn

Perhaps I am not the one to ask. There is equipment in Alberta and to my knowledge the Ministry of Environment is looking into this. I really don't think that B.C. Hydro has any plans to actually acquire this type of equipment. It is available; however, I don't believe it's entirely proven to everybody's satisfaction. I guess we will just have to wait and see. It's a hard one to answer.

Question

What role do you play in evaluating independent power producers?

Dr. Hathorn

At this time we are simply in a very broad brush screening mode to evaluate independent power producers. The intent of this is that the independent power producer is obligated to do his own homework. He must establish the manner in which he is going to function, and that includes the environmental permits, and the environmental assessments. He must go through that process himself. It is, after all, a provincial responsibility and not one for B.C. Hydro.

Question

I wonder if you could comment on to what extent decisions on water drawdown made by B.C. Hydro and Bonneville Power Administration make on the Columbia River, and what priority do B.C. environmental concerns have on Columbia River operations?

Chris Boatman

Maybe it's unfair to ask Zig that question. Maybe I can use my prerogative and just comment on that in my role with the organization. The Columbia River Treaty is essentially a Treaty on maximizing the river for power use. Remember the Treaty was put in place in 1964 and I think we saw quite graphically earlier this afternoon from those young people how values have changed from 1964 to now. Certainly we see and anticipate additional concerns and value changes by the public. We have certainly seen this happening south of the border and we have every expectation that it will happen north of the border as well. However, the Treaty itself is one that talks about maximizing the Columbia River for power generation.

Exhibit 5-47

ENVIRONMENTAL RESOLUTION AND PRINCIPLES

> "IN CARRYING OUT ITS BUSINESS, B.C. HYDRO WILL MINIMIZE ADVERSE EFFECTS ON THE NATURAL AND SOCIAL ENVIRONMENT AND ACTIVELY PURSUE OPPORTUNITIES TO MANAGE OUR RESOURCES FOR THE BENEFIT OF PRESENT AND FUTURE GENERATIONS".

* Include consideration of the full range of natural and social environmental impacts in all of B.C. Hydro's actions from initial planning and operations to decommissioning and disposal.

* Promote a balance between resource use and conservation in providing B.C.'s energy needs.

* Utilize presently developed resources to achieve optimum efficiency before developing new energy sources.

* Pursue opportunities to replace in kind natural or social resources affected by B.C. Hydro's actions.

* Promote appropriate recreational and commercial use of B.C. Hydro reservoirs, rights-of-way and other properties.

* Develop an on-going corporate-wide audit process of environmental performance, for regular review by the Board of Directors, to ensure that risks to safety, health and the environment are minimized.

* Become a corporate leader in furthering awareness of local, provincial and global energy issues and actively participate in actions to deal with those issues.

* Work with industry, government, public and other institutions to create and maintain a safe environment through a cooperative approach that shares information, knowledge and experience.

Exhibit 5-48

COMPONENTS OF ENVIRONMENTAL PROTECTION

- Strategic
- Implementation
- Tactical

Exhibit 5-49

PRINCIPLES 2 AND 3

- Promote a balance between resource use and conservation in providing B.C.'s energy needs.

- Utilize presently developed resources to achieve optimum efficiency before developing new energy sources.

Exhibit 5-50

POWER SMART

*	Industry	-	Efficient electric motors.
		-	Air compressors.
*	Commercial	-	Energy audits.
		-	More efficient roadway lighting.
*	Residential	-	Efficient appliances -- refrigerators.

RESOURCE SMART

* Improved heating, ventilation and lighting controls.

* More efficient turbines.

* Revelstoke Tailrace.

* Adding units to dam where none now present.

* Raising Seven Mile water level.

Exhibit 5-51

PRINCIPLES 1, 4 AND 5

* Include consideration of the full range of natural and social environmental impacts in all of B. C. Hydro's actions from initial planning and operations to decommissioning and disposal.

* Pursue opportunities to replace in-kind natural or social resources affected by B.C. Hydro's actions.

* Promote appropriate recreational and commercial use of B. C. Hydro's reservoirs, rights-of-way and other properties.

Exhibit 5-52

NEW PROJECT DEVELOPMENT

- Full Assessment
- Minimize Impacts / Maximize Benefits
- Seek To Compensate In-kind
- Williston Compensation
- Puntledge River

Exhibit 5-53

CONSTRUCTION

- Not Only Major Projects
- All Linkages Explored
- Specifications in Contracts
- Contingency Plans
- Environmental Monitors

Exhibit 5-54

OPERATIONS

* PCB Management

* Debris Management

* Recreation Facilities

* Vegetation Management

Exhibit 5-55

PRINCIPLES 7 AND 8

- * Become a corporate leader in furthering awareness of local, provincial and global energy issues and actively participate in actions to deal with those issues.

- * Work with industry, government, public and other institutions to create and maintain a safe environment through a cooperative approach that shares information, knowledge and experience.

Exhibit 5-56

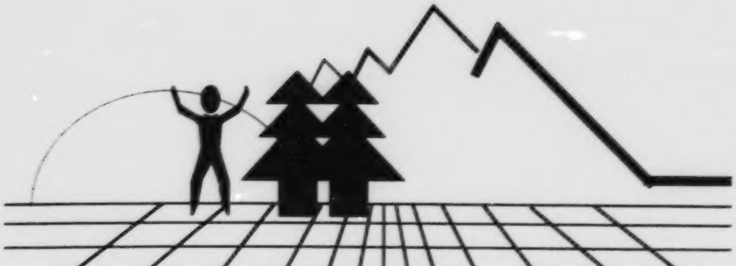
B.C. HYDRO
ENVIRONMENTAL AWARENESS PROGRAM

OBJECTIVES

- PROVIDE AN AVENUE FOR TWO-WAY COMMUNICATION ON MATTERS OF ENVIRONMENT.
- PROMOTE AWARENESS OF ENVIRONMENTAL ISSUES.
- PROVIDE FACTUAL INFORMATION TO ENSURE AN UNDERSTANDING OF ENVIRONMENTAL MATTERS.
- IDENTIFY AREAS WHERE WE CAN IMPROVE IN OUR ENVIRONMENTAL PERFORMANCE.

THIRD ANNUAL
ELECTRIC ENERGY
FORUM

Lifestyles, the Environment and Electricity Use



ENERGY CRISIS SIMULATION

Energy Crisis Simulation

Moderator Walter Hardwick and Panelists

Introduction

On the second evening of the Forum an energy crisis simulation was staged. The purpose of the simulation was to demonstrate what impact a shortage of electricity would have on the fictitious town of "Prince James", British Columbia; and to help Forum delegates understand the connection between lifestyles and electric energy consumption.

A copy of the "Prince James Chronicle" newspaper was distributed at the dinner which preceded the Crisis Simulation. (See Exhibit 5-1 at the end of this section.)

Moderator of the Crisis Simulation was Professor Walter Hardwick of the Geography Department of the University of British Columbia. The following volunteer panelists helped act out the community reaction to the energy crisis in "Prince James":

GOVERNMENT REPRESENTATIVES

- Bill Best, Consultant, formerly with the B.C. Utilities Commission and B.C. Hydro
- Wendy Herbert, Principal, D.P. Todd Secondary School, Prince George
- George McKnight, former Alderman and Emergency Coordinator, Prince George
- Fred Weber, Chairman, Open Learning Agency, West Vancouver

COMMERCIAL REPRESENTATIVES

- Sonja Filipovic, President, Business and Professional Women's Club, Prince George
- Jim Savage, Community Economic Development Planner, Prince George
- Bill Vance, Manager, Sears, Prince George

RESIDENTIAL REPRESENTATIVES

- Irving Fox, Professor Emeritus, University of British Columbia
- Chris Ritchie, Carrier Sekani Tribal Council, Prince George
- Susan Ryan, Homemaker, Prince George
- Megan Szanick, Student, Kelly Road Secondary School, Prince George

INDUSTRIAL REPRESENTATIVES

- Bill Haviland, former Manager, Prince George Pulp and Paper, Prince George
- Mark Williams, General Manager, Decker Lake Forest Products Limited

Their participation in helping to stage this Energy Crisis Simulation is acknowledged with thanks.

The simulation was video-taped for television. The following is a transcript of the television program script.

Announcer

Good evening Ladies and Gentlemen. Electricity at the touch of a switch is something we all take for granted, but we now know that if we continue to increase our demand for electricity at present rates, the quality of our environment may suffer. This means we should all seriously consider how we can use electricity more efficiently and what consequences this might have on our lifestyle.

It was to help us think about these issues that B.C. Hydro staged an energy crisis simulation at the Third Annual Electric Energy Forum, held in Prince George on May 6-8, 1990. We asked the Forum attendees to imagine an energy crisis so large that every community in British Columbia had to reduce its electricity use by 25 percent. The scenario is as follows:

There's been a four-year drought in "Prince James". Water levels behind the dams are becoming very low. The snowpack is disappointing and there are no supply-side options, no convenient borrowing of hydro power from a neighbouring province or state, no alternate oil or gas on-tap, and no emigration option either. In short, electricity cuts have to be made now by every community in B.C., including the fictitious town of "Prince James". As we join the energy crisis simulation, on-stage are assembled the Prince James decision-makers. There are experienced representatives from the industrial sector, where pulp and paper is the main local employer. From the commercial sector - business services, stores, hotels, restaurants, etc., and of course, concerned "Prince James" residents. To help them, B.C. Hydro has prepared an extensive list of electricity savings options they might wish to consider. Everything from turning down the thermostats at home to closing down production lines in the work place. Their task tonight is to achieve a 25 percent reduction in "Prince James" electricity use. The moderator for this energy crisis special is Professor Walter Hardwick of the University of British Columbia.

Professor Hardwick - Moderator

Well, as everyone knows we have a major problem that we have to deal with this evening: a 25 percent reduction in electricity consumption, and this is not going to be a simple task. Now you panelists have had an opportunity to spend a little time in seeing what kind of initial energy cuts that you might be able to accept with on a realistic basis. As you know, about 45 percent of the electricity consumed by this community is used by the industrial sector, about 25 percent is used by the commercial sector and about 25 percent is used by the residential sector, and the remaining five or six percent is used by government. Now let's get down to business. What we would like to do is find out from the caucusing that has already taken place, what kinds of electricity cuts you believe that you can sell to your neighbours or your fellow business persons, so that we, in fact, can meet this instant challenge that we have been given today. Now, who is going to speak for the residential community?

Chris Ritchie, what kind of energy-saving ideas have you got for your community?

Chris Ritchie - Residential

Well Walter, we are going to leave space heating alone to begin with. We won't be cooling off any of the houses. However, we are going to address several water-heating issues. First of all, we'll adopt low-flow shower heads, we'll lower our hot water tap temperatures, and reduce shower time from an average of 7 minutes to 3.5 minutes, and we'll add an insulating blanket to all electric hot water tanks.

Walter Hardwick - Moderator

Okay, so these are three major things that you believe you can sell to the residential community. Do the rest of you agree that that is realistic? I think it's rather surprising that on average, people take seven minutes per shower.

Chris Ritchie - Residential

Well, I take much longer, I think. Walter, one of my associates has a switch on his shower head and so he turns the water off when it's not needed.

Walter Hardwick - Moderator

So we have one category here, water heating with some savings. What else have you got?

Chris Ritchie - Residential

In the cooking area we are going to eliminate the use of microwave ovens for defrosting.

Walter Hardwick - Moderator

Okay. Is that is a major item - defrosting?

Chris Ritchie - Residential

Well you wouldn't think so; but, the amount of energy saved is significant. With regards to refrigerators and freezers, we are going to install fridge strip curtains inside refrigerators.

Walter Hardwick - Moderator

What would that be? Are they some sort of plastic strips?

Chris Ritchie - Residential

That's right. You can look through the plastic and reach for what you want without having all the cool air flow out into your kitchen. Another thing is to limit refrigerators to one per household. And finally, we'll try to use chest freezers instead of upright fridges with freezer compartments.

Walter Hardwick - Moderator

You'll have to explain that to me. What's a chest freezer?

Chris Ritchie - Residential

A chest freezer is one where the lid opens upwards. And as we all know, cold air sinks, so it can't flow out of a chest freezer like it does out of a regular upright refrigerator when the door is opened.

Walter Hardwick - Moderator

Okay, so we've got some energy-saving ideas. Are there any more categories from a residential point of view?

Chris Ritchie - Residential

Certainly, so with regards to washers, dryers and dishwashers, we are going to eliminate electric clothes dryers and hang our garments to dry.

Walter Hardwick - Moderator

Does that mean you are going to hang them outdoors?

Chris Ritchie - Residential

Well, not necessarily, but in summer months there's no reason not to. And on crisp winters days there's no reason not to, and we could also use...

Walter Hardwick - Moderator

It's clear that Prince James isn't Prince Rupert if you are going to do it that way.

Chris Ritchie - Residential

Well then, we can use the ambient heat from furnaces in the house to dry clothes to a certain extent; and also, we'll eliminate the drying cycle when we use our dishwashers.

There are two other sections - lighting, turn off all unnecessary lights; and to use task lighting rather than room lighting.

Walter Hardwick - Moderator

Okay, what do you mean by task lighting?

Chris Ritchie - Residential

Task lighting involves lighting only over the work site. If you are at a sewing machine or at a desk or reading.

And finally with regard to miscellaneous uses, we don't all see the need for heated waterbeds. Some would have them eliminated.

Also we are going to use hand-operated beaters and blenders, and also reduce TV hours by 50 percent.

Walter Hardwick - Moderator

Well there may be some advantages in reducing TV viewing hours for other purposes than energy savings. So that basically means that you have gone through the various categories that you could deal with. While the B.C. Hydro people are busy working on their calculators to be able to tell us in a minute or so what these choices mean with respect to the savings in residential energy consumption; I am going to talk now with the commercial group to find out what savings they can make. Now, who's the spokesman for the commercial group? Sonja?

Sonja Filipovic - Commercial

Hi. What we've decided to do in terms of commercial businesses is to increase our expenses a little bit because we recognize the importance of saving electrical energy. So in terms of heating and ventilation, we will be installing heat-mirror window films which provide extra insulation and we will be trying to keep the doors closed. We'll reduce the heating and cooling which will cause some discomfort, but we believe in the long term it will be better for us all.

Walter Hardwick - Moderator

What do you mean by cooling? You mean that you are not going to air-condition your stores and offices?

Sonja Filipovic - Commercial

No, we are not going to be using air-conditioning in summer and we are going to lower the thermostat setting during the winter months.

We will also lower the hot water tap temperature across the entire commercial sector. We will also replace or fix all dripping hot water taps across the board.

Walter Hardwick - Moderator

Are these important items from your point of view?

Sonja Filipovic - Commercial

We feel that, while they are not significant energy users, they are energy wasters and we can all benefit from the energy saved. Each little bit counts.

We will also insulate and wrap electric water heaters. We don't feel that there is much of an offset to make up the heat now radiated off the water heater because those facilities are usually in a room by themselves which does not have to be heated.

We will encourage the use of energy-efficient fluorescent lights where possible. We will maximize working during daylight hours, which will cause some inconvenience, but we will work our schedules around it.

Walter Hardwick - Moderator

So this means that you are going to do away with night shopping?

Sonja Filipovic - Commercial

Pretty well, yes.

We are going to lower after-hour light levels and we are going to convert all exit lamps to compact fluorescent.

We are also going to ban non-essential activity in evenings.

Walter Hardwick - Moderator

Could we just stop for a second? Is this lighting issue a major issue in the commercial sector?

Sonja Filipovic - Commercial

We feel it is. I think everyone objects to with office buildings left empty with the lights on, and we feel that's an area we can control.

Walter Hardwick - Moderator

So it would be a major one. Okay. Thank you.

Sonja Filipovic - Commercial

We are going to try and ban non-essential activity after 9:00 p.m. We will also turn off photocopiers and computers at night when not in use. We feel the inconvenience and loss of productivity will be minimal. We will also be installing timers on outlets for vehicle block heaters. Basically those savings apply for commercial as well as wholesale and retail, so there's no need in repeating them.

Where fluorescent lights are, we will have them made energy-efficient by replacing tubes going from a 40 W tube to a 34 W. We will also explore putting in reflectors, and if Bill wants to, he can expand on that.

Walter Hardwick - Moderator

Have you got a comment on that?

Bill Vance - Commercial

Well, yes. In a study that we recently had done in our business, we found that by taking a normal four-bulb fluorescent fixture and putting in a reflector, which is an aluminum high-gloss reflector, we can remove two lamps and one ballast out of each fixture and come up with practically the same light levels.

So really in effect, we can save half the cost of the operation of fluorescent lighting, which of course not only affects our area, but certainly the other businesses as well.

Walter Hardwick - Moderator

So what you are basically saying is that you have an economic saving which is also going to help us with this major crisis which we are dealing with today, and that one change could reduce your energy consumption by one quarter.

Bill Vance - Commercial

That's right.

Walter Hardwick - Moderator

Interesting.

Sonja Filipovic - Commercial

Again, when we get into "commercial miscellaneous" we will reduce the heat and cooling. We'll also use heat-mirror windows. We will also try and stop non-essential activity after 9:00 p.m., e.g. theatres, and skating rinks - by suggesting early closing.

In terms of hot water cooking and refrigeration, we will lower hot water tap temperatures, fix dripping hot water taps, and install shower flow restrictors, and insulate electric water heaters.

Commercial electric lighting, again; we will go to energy-efficient fluorescent lights. Maximize daylight hours and minimize after-hour light levels although we do recognize there is a security risk.

Walter Hardwick - Moderator

We may want to come back at some of those because security is an important issue in communities.

Sonja Filipovic - Commercial

That's right, but we feel that if we can all pull together, we'll take a little bit of a risk in the hopes that the community will back us on this.

Walter Hardwick - Moderator

Well thanks very much Sonja.

Let's go over to the industrial sector because according to our figures, industry consumes 45 percent of the electric energy in this community, and if we are going to meet this kind of crisis that we are in now, we are going to have to understand what the implications of this will be to a pulp and paper mill, to oil refineries, sawmills, and so forth, that are major employers and major generators of wealth in the community. So what do you, in the industrial sector, have to offer?

Bill Haviland - Industry

Well Walter, let me speak for the pulp and paper segment first. Because downtime is so devastating to the industry and has such a long-term impact, that the major area of energy savings possible by cutting back on plant hours is not available to us. However, we can do many of the things that have been talked about for the commercial and the residential areas, and so we can reduce the load on lighting and miscellaneous by about 25 percent.

Walter Hardwick - Moderator

What you are saying is that you really cannot cut back operations in the pulp and paper production.

Bill Haviland - Industry

The consequences would be extremely serious.

Walter Hardwick - Moderator

Well can you just tell us a little bit about these consequences, because I think that before I go back to these other sectors, they should understand what the implications are.

Bill Haviland - Industry

Well, in a process like pulp and paper production, you don't really save a significant amount of electricity by slowing down. What you are talking about is either running flat out or shutting down. The suggestion of possibly reducing operations by eight percent, I calculate would result in at least a 28 percent reduction in profits. That is only part of the problem. The markets for pulp and paper are secured in an annual renewable basis; so defaulting deliveries would make you a non-reliable supplier, and the buyers you default on, you lose. Whether you can regain those lost sales later would be very questionable. And of course, another consideration is that downtime does have a direct impact on the major part of the community, since we are the major employer.

Walter Hardwick - Moderator

What about the sawmill industry? Because you operate a little differently than the flow of pulp and paper production, can you save more energy there?

Mark Williams - Industry

Yes, that's right, Walter. We have quite a bit more flexibility in sawmills because of our flow process. We aren't dependent on keeping a single flow going at all times.

Walter Hardwick - Moderator

Does that mean that you can cut back from two shifts to one, or three shifts to two shifts?

Mark Williams - Industry

Well it is a possibility. However, we would hope to postpone that as long as possible because obviously it would cut into a sawmill company's profitability substantially.

Bill Haviland - Industry

Really, its the only area available to us on a short-term basis, I'm talking within one year.

Walter Hardwick - Moderator

Well, we are talking about effecting major savings instantaneously.

Bill Haviland - Industry

Okay, instantaneously we can do many of things that have been mentioned before. I feel it's reasonable to go for a 25 percent reduction in lighting and other minor loads that don't affect production, but we would have to be very careful to guard doing anything that would jeopardize our safety in the plants.

Walter Hardwick - Moderator

You don't want Workers' Compensation coming after you.

Bill Haviland - Industry

That's right.

Mark Williams - Industry

Walter, if I could just add a point to that. In the sawmilling community in the Interior of the Province, during the past decade, we've been forced into becoming very cost-conscious; primarily because of high fibre costs arising from higher stumpage fees. As a consequence, we have become very cost-efficient. We've already made the savings where they can be made. As Bill has just said, we can make some minor savings in lighting and so on, but compared to the residential and commercial sectors, it's not so significant.

Walter Hardwick - Moderator

Okay. Well, I guess what we really have to do, Bill, is to find out where we're at with respect to the savings we've made so far; but it sounds to me as if the industrial sector is not prepared to contribute to this emergency situation to the same degree that the commercial and residential has. The industrial sector has saved 0.8 percent. So now we've saved 17 percent of our electric energy usage. We'll come back to industrial. Let's find out what the government sector is going to do.

Bill Best - Government

Well Walter, as you know, the government sector represents a relatively small proportion of energy use but in our view it's extremely important that the

Bill Best - Government

Well Walter, as you know, the government sector represents a relatively small proportion of energy use but in our view it's extremely important that the government sector set a good example and show some real leadership in this. So we have tried to establish a rationale by which we would look at the various energy uses in this sector, which includes government offices, health, hospitals, clinics, school and colleges. So we set up three categories of our energy use. The first category we called, as Hydro does, the Power Smart category. It includes anything that is economically sound, has a good payback, and offers long-term energy benefits and savings. We automatically accepted each of those. And those are the kinds of things some of which have already been mentioned. They include using heat-mirror windows, adding extra insulation, keeping doors closed. It includes fixing dripping hot water taps, insulating electric hot water heaters, replacing incandescent with compact fluorescent and using energy-fluorescent lighting; all of these Power Smart items. These are some of the examples.

The next category we looked at was ones that are still economic and have an element of Power Smart in them, but they carry the additional disadvantage of some inconvenience, some cost, and require a longer payback period. But from the leadership point of view, we're prepared to make all these changes. The only thing that we are leaving in, and not eliminating from energy use within this sector, are those items that we feel would preclude us from providing the essential services in the category that we deal with. So we've been able to make about a 33 percent reduction in our total energy use.

Walter Hardwick - Moderator

Okay, that is something from the political point of view and you think you can sell your program in your communities.

Ladies and gentlemen, our Hydro experts tell me that we have now achieved an 18.7 percent electric energy reduction, but our target is a 25 percent reduction.

George McKnight - Government

Mr. Chairman. I have a couple of concerns. Representing City Council, I think it's important that we have a sense of credibility with this thing. Now there are two areas. One is a give and one is a take. I will deal with the give first.

I think it's reasonable to expect this community to want to participate in energy saving wherever they can; but, I think that we have to have a sense of consciousness about it and there is a limit of where comfort and savings can't cross over. I believe one of those issues is in the residential sector, where they said they were going to stop heating their waterbeds. I think we are going to ask for a lot of trouble if we try and get that one through this community. There are a lot of people, especially the elderly, who have waterbeds and probably would not accept a cut like that.

Walter Hardwick - Moderator

Okay, who wants to tackle that one?

Bill Best - Government

I would add to that, I wonder if Chris Ritchie has ever slept on a cold waterbed?

Chris Ritchie - Residential

I just want to say, Walter, that I appreciate the government leadership and their 0.9 percent reduction, that the residential sector has achieved nearly nine percent. So, granted that it's not quite ten times what you guys are saving; thank goodness the government people haven't changed.

Susan is our waterbed expert. And I have slept on waterbeds before.

Susan Ryan - Residential

Quite frankly, I would agree with the famous alderman that it would be very difficult to convince the taxpayers not to heat their waterbeds. They would be exceedingly cold. But in fact, all people in the know, are aware that all waterbeds are very unstable things to sleep on, and the ligaments in our backs are in tension and jive all night long. The best bet, if you want an honest answer, is a nice piece of wood with four inches of foam, and you will sleep like a baby.

George McKnight - Government

Mr. Chairman, I'm just saying that for the residential section, for credibility's sake alone, we should take that cut off the list.

Susan Ryan - Residential

What's wrong with throwing on an extra blanket? What's the matter with that?

Walter Hardwick - Moderator

Or get a sheep skin.

Bill Vance - Commercial

Sure, get a sheep skin.

Susan Ryan - Residential

Actually, on the message of heating. I think perhaps I could voice an issue I'd like to raise with industry. We did approve cutting back on residential heating in every dimension, but I was going to put a question to industry. I wonder if it wouldn't be energy-wise to install a hot tub at the home of every employee in their mill because it may take a lot of energy to heat a hot tub, but the family communication improves extensively and they can use their hot tub for cooling off in hot summers; and to discuss life and the energy crisis in detail.

Wendy Herbert - Government

Mr. Chairman, I'm really having a lot of trouble with the credibility level here. It seems to me that we should look at the residential sector and deal with the electric load for heating pools and spas and so on, and the amount of megawatts that they consume. It would be very wise to include this as one of the cuts. We are talking about a 12-month cut, certainly, and perhaps slightly longer than that; but, if we are going to have credibility among us, it seems to me far easier to argue for the elimination of hot-tubs for a year than to argue a person's sleeping time.

Walter Hardwick - Moderator

Now, these are really comments on what other people are proposing. You are suggesting that they in fact renege on some of their proposed savings. I am faced with something else, and that's the need to find another seven percent cutback. Now this means that each of the sectors are going to have to now come up with additional cuts.

George McKnight - Government

Mr. Chairman, I indicated that I was just wanting to see residential accept a smaller energy saving by putting the small waterbed energy use back in. Now on the industrial sector, I am very aware that industry in British Columbia, for many years under previous mandates and previous governments has enjoyed extremely cheap sources of power. There is only one reason why industry hasn't generated its own power and that's a simple fact that it's cheaper to buy it from B.C. Hydro. What Hydro wanted to do was sell a lot of power. I'm suggesting that industry has got to take some production cuts and use their own resources and their own initiatives and creativity to find alternate sources of energy, whether that's electricity or not. I think the emergency situation in this community is such that we can no longer afford to have the industry sector make less than a one percent reduction in this emergency. We are talking about saving 25 percent and I think you in industry have the necessary tools, imagination and a very buoyant paper and lumber market in the community at this date to be able to take a production cut and recover on your own initiative and authority.

Mark Williams - Industry

Mr. McKnight, I'd have to take exception to some of your comments. It's my experience in industry, for some reason, that a lot of people from residential sectors and commercial sectors don't have the correct facts for dealing with alternate sources of energy.

I speak now from a sawmill perspective. A lot of people can criticize us because we burn our wood waste and we're faced with the problem that we not only pollute the environment, but unfortunately, we also waste energy as well. Our Prince James sawmill has been actively looking at alternate sources of electricity, such as cogeneration, for example. We've looked at a wood pyrolysis where we take wood, gasify it and put the gas through electrical generating units. In addition to creating electricity, we also get a carbon byproduct which we can sell. However, the cost of such a project is far in excess of our present cost of electricity.

Jim Savage - Commercial

I'd like to make a couple of points here to remind the group that Canadians are the most profligate users of energy in the world. Even adjusting for climate and our great distances, we are the world's greatest energy hogs. We have to keep that in perspective. We have a moral imperative here to start taking some important steps.

The second point I'd like to make is that, from a community economic point of view, this waste amounts to a tremendous leakage of resources from our community. The money that is wasted is going straight out of our community and into Head Offices such as B.C. Hydro or overseas, or wherever. As perhaps an interim measure, industry has neglected to look at the adoption of energy-efficient motors, adjustable speed drives, more efficient lighting like high-pressure sodium. These things alone would contribute almost three percent saving in Industrial's energy use. Now...

Mark Williams - Industry

We looked at them about three years ago and many of them are already in place. For example, we already have our high pressure sodium lights.

Jim Savage - Commercial

According to the information we have, you don't have them in place yet. I feel that we shouldn't look at throwing people out of work, even temporarily, if we can squeeze more savings, out of the residential sector, where it affects everybody equally. I think that's who we should go after.

Walter Hardwick - Moderator

Okay, but for you in the industrial sector, there is challenge that there are in fact other places that you can cuts. What do you say to that Mr. Haviland?

Bill Haviland - Industry

Let me take some of the questions that were brought up here.

Back in 1972 there was an energy crisis and at that time the whole pulp and paper industry in Canada set targets for energy reduction which has already paid off in a reduction of energy consumption per ton, to the tune of about 30 percent at this point in time. Those targets are still there and our plant has been a part of that effort.

Walter Hardwick - Moderator

What you are basically saying is, there is nowhere else to go for further cuts in the industry sector?

Bill Haviland - Industry

I'm saying that we have been working towards energy efficiency, and a very significant effort has been made in past years.

Bill Best - Government

We're getting a political speech here instead of getting down to the facts.

Bill Haviland - Industry

You're getting the facts.

Bill Best - Government

We've got a reduction possible by using sodium lighting, that's a fact. Now have you considered that and is that included in your cuts?

Bill Haviland - Industry

Yes, we have considered that. The cost of converting....

Bill Best - Government

Never mind the costs, has that been included in your cuts?

Bill Haviland - Industry

...in our Prince James mill, it would be about a million dollars. The delivery of that energy saving would be made maybe within a year.

Bill Best - Government

But this item, 413 MWh; has that been included in your offerings so far tonight?

Bill Haviland - Industry

High-pressure sodium lighting is a new standard, as of the last two years, for pulp and paper operations. And there is a progressive change, but you can't find the money to go out and spend a million dollars on that...

Bill Best - Government

Well that's another item. The question is the 2000 MWh that are listed here as being available for energy cuts, and as far as I understand, sodium lighting has not been included in your cuts. Is that right?

Bill Haviland - Industry

No.

Bill Best - Government

Well I think you should include it in your cuts.

Bill Haviland - Industry

We estimate that we're changing about ten percent of our lights each year and this year we would complete another ten percent. May be that could be accelerated somewhat, but there are.....

Bill Vance - Commercial

Sir, we're in an energy-crisis situation and I think you are going to have address that much more rapidly than ten percent a year.

I'd also like to add to that. I would like to know why you are not in a position to be able to shut down production for one month out of the year. Perhaps you could shut your plants down and do all your maintenance work that has got to be done. Remember that your employees all have to have vacation. While they're away, you retool, you do what you have to do, and you start up in a month from now.

Bill Best - Government

Yes, and you change your sodium lights.

Bill Haviland - Industry

I did partially try to answer that. Let me repeat and amplify on what I said. The investment in the pulp and paper operation in Prince James amounts to about one billion dollars on a replacement basis. Any reduction in tonnage has a very significant impact on the profitability. The carrying charges are very significant. The fixed charges are very significant. If you start reducing tonnages, you don't have the tonnage to write these costs off against. I calculate that a reduction of one month in production would make the pulp and paper operation non-viable, and the point is that that is not just a reduction for this year. If you take one-twelfth of your tonnage out of the market, you are not going to get that back in the next year, even if you can start up again.

Bill Vance - Commercial

I might point out that if you don't get this energy reduction into place, we are facing major cuts next year and I don't think we can accept the answer that we are worried about the bottom line when it comes to a crisis situation.

Bill Haviland - Industry

It's not the bottom line. It's the viability of the industry staying in Prince James.

Walter Hardwick - Moderator

I think we understand Mr. Haviland's concerns very clearly. But it's also clear that the people who are in the commercial, residential and government sector aren't entirely convinced. Since you were able to make so many cuts so fast, I want to find out from these other sectors what other things that you can do. Now, have the commercial people have considered other places in which they can cut? Mr. Weber?

Fred Weber - Government

There is another place we could cut. In our lighting alone, we are going to have some cooperation from other governments. For instance, I'm involved in a building in town and it's rented by the Federal Government, and the Federal Government has very specific lighting standards. Now what we would very much like to do, in this building, is to put in fluorescent fixture reflectors which could possibly cut our lighting bill by ten percent. But we must get some cooperation from the Federal Government to say, "Okay, we'll go along."

Walter Hardwick - Moderator

Do it now. We are in an emergency situation. Let's ask the Federal Government afterwards.

Fred Weber - Government

We expect that we'll be able to give that cooperation. We have already said that we will do it; but, we are going to have to have cooperation from other levels of government.

Another thing we can do that's positive though, and I'm speaking now of the broadcast industry. We have, in this town, a 20 kW television station but because we are in the north, we have 85 percent cable penetration. We can use our standby transmitter which is only 100 W, and that will not lose much coverage. We might have a little bit tougher time reaching the few homes in the very outside of our coverage area. That could save us as much as 15 kW because we can shut down our 20 kw transmitter and....

Walter Hardwick - Moderator

Our colleagues from Hydro are now including that saving. Have you something else in the commercial sector, Sonja?

Sonja Filipovic - Commercial

Yes, we have discussed cutting back on store opening hours and going from a 55-hour week to a 40-hour week. There would not be a significant loss of employment, although there would be some in going from an 11-hour day to an 8-hour day.

One thing that I'd like to point out in the residential sector is...

Walter Hardwick - Moderator

Let's just make one thing clear, that you are committing yourself to deal with your merchants association to cut back from 55 to 40 hours per week.

Sonja Filipovic - Commercial

Yes, we are.

Walter Hardwick - Moderator

Are you agreeing?

Fred Weber - Government

Yes, that's right. We are agreeing, but it's not quite the way it sounds. We don't expect to inconvenience either customers or tourists going through because this would be done on a rotational basis on different days, so that we will always have some stores open for tourists.

Walter Hardwick - Moderator

Okay, very good.

Now Sonja, you had another point for the residential people.

Sonja Filipovic - Commercial

I think that we are going to have to ask the residents in this community to bite the bullet a little bit and set back their thermostats more.

Several Persons

Absolutely...Yes...

Walter Hardwick - Moderator

What about this. Here's a challenge to you people.

Chris Ritchie - Residential

I think we've bitten quite enough bullets.

Walter Hardwick - Moderator

Oh no. Now look, you aren't taking all the bullets. Now let's talk about thermostats. Have you discussed thermostats?

Chris Ritchie - Residential

Yes we have...

Walter Hardwick - Moderator

I see that you are wearing your sweater.

Chris Ritchie - Residential

That's right, our sweaters and our hats. And we are willing to set our thermostats to 15 degrees and adopt a sweater approach as it were. You know, 15 degrees Centigrade is only 59 degrees Fahrenheit. That's pretty cool.

Walter Hardwick - Moderator

Do you think everybody can do that? What about older people?

Susan Ryan - Residential

Absolutely.

Chris Ritchie - Moderator

We expect some people to, if they are ill and what have you, to maybe not abide by the letter of it, but we think that the spirit is there.

Some other things that I think we'd be willing to entertain, Walter, are to increase the insulation in our homes and adopt double glazing on the windows. That is going to be a significant financial cost, but we recognize that these are tough times. Please note, industry, that the bottom line is not necessarily the only consideration.

Walter Hardwick - Moderator

And you could presumably also use polyethylene or some other clear plastic window covering, not just put in double glazed glass, which would be more expensive.

Chris Ritchie - Residential

Another significant outlay for people that we would be willing to entertain would be to purchase Power Smart approved appliances. It makes more efficient use of the power that is used. Another thing that we can entertain is to handwash all dishes. It's a little added effort....

Walter Hardwick - Moderator

Are you going to let him get away with that?

Sonja Filipovic - Commercial

No, but I think you can be Power Smart during the day. For example, you would never put a dishwasher on more than once a day. Bottom line. A family with six people shouldn't use that [the dishwasher] more than once a day and should never use the heat cycle at all. But I was going to suggest, beyond the dishwashing chore to refer to cooking, and thinking of our friends in industry and their troubles with shutdowns. Flow time in a household works differently. I wondered if our city might consider instituting odd and even day cooking, just like we do odd and even day sprinkling, because perhaps, in conjunction with our freezers, we might use a lot less energy.

Walter Hardwick - Moderator

Well, it's an idea. Now, we haven't heard from anything from students in theschools. What do you think, students, is there anything you have to add that you think would help us in our endeavour?

Megan Szanick - Residential

I don't understand what you mean.

Walter Hardwick - Moderator

I was just wondering, are there any energy savings which teenagers and young people could adopt? Are you agreeing on everything else that the other residential people are putting forward?

Megan Szanick - Residential

Basically I think the smaller household appliances such as curling irons, blow dryers, and things like that, could be used less often. That's what a high school student uses the most.

Walter Hardwick - Moderator

Do you think that all high school students probably use them?

Megan Szanick - Residential

Yes.

Bill Best - Government

I think the most productive thing we can do is go back after industry again.

I'd like to know about compressed air leaks for example. Have you gone through your compressed air systems and are you satisfied that you are not wasting any energy in your operations at all now?

Mark Williams - Industry

Mr. Chairman. Maybe I could make a few points here. In appreciation of the sacrifices that we have seen from people who now sleep on heated waterbeds and from the commercial sector, we are willing to make some sacrifices of our own. But just to respond to that last comment, I think it's quite common throughout industry and certainly for our sawmill in Prince James, that B.C. Hydro's Power Smart program has come around and helped us to assess air leaks in our compressed air system, so we already made substantial savings there. That's one thing that we've helped ourselves with already.

However, we are willing to make another concession. Now I'd like some feedback from the residents who could speak on behalf of our employees. Perhaps you could represent them for us.

In consideration of this hot weather we've been having, we can make some savings in our kiln drying expenses by air-drying our lumber. What I would propose to the employees of the company is that everyone take their holidays at the same time and we shut the operation down for one month. Most people of this company have been here for over five years now so the average holiday leave is three weeks. So if we take an extra week and take the advantage of this hot weather, we can get some of our lumber air-dried rather than kiln-dried and perhaps the experts on the computer can work out what difference that would make if we were to shut down 800 horsepower on a 24-hour operation for one month.

I put it back out to the people of the community - are you willing to work together and help us through this crisis and take a month off together at the same time? I put that on the floor.

Chris Ritchie - Residential

I think that's a very gracious minimal offer by industry that could amount to approximately an eight percent reduction in kiln loads. Four weeks a year is about an eight percent reduction. I think that it is all too apparent that, in the winter, the only place a family can warm up is by going to the office. I'm sure the employees would be willing to structure their holidays somewhat to take advantage of the summer months so that it can save a few extra shekels for industry. I don't think that's a big hardship. I'm sure that the workers will be able to make these sacrifices even if industry seems unwilling to compromise their profit motive.

Walter Hardwick - Moderator

Okay, but listen. We've got a very serious suggestion that we've got a one-month shutdown in the sawmill industry and that cannot be taken lightly, and so that proposal now takes us well over the 20 percent mark. So that clearly, despite all the detractors of industry, is something that has made a very significant difference in terms of meeting our goal.

So I really want you now to say, "I can also do this", or "We can do these additional things."

Bill Haviland - Industry

There are essentially two shutdown periods a year in the pulp and paper operation. They normally total about seven days, a four-day and a three-day. I think that we would have to commit, in light of the feeling of the group, to extending that somewhat, but we can't extend it to the point of jeopardizing customer deliveries. That is what we exist on.

Walter Hardwick - Moderator

I agree.

Bill Haviland - Industry

One additional week. We can accept seven additional days downtime on an annual basis, but I must say that it's impossible to go beyond that without jeopardizing the viability of the industry, both from a marketing standpoint and a profitability standpoint.

Walter Hardwick - Moderator

I think your detractors around the table are beginning to accept your problems. Sonja, have you got other things that the commercial sector can do?

Sonja Filipovic - Commercial

Well, I'd like to talk it over with the people in my group, about the installation of timers and photocells to control lights. Now there will be an added cost to our operations if we do that.

While we are discussing that, I would like to clarify what the government people have done. Have they looked at converting exit lamps to compact fluorescent and using occupancy sensors to control lights, and turning off ceiling lights and using task lighting where possible?

Wendy Herbert - Government

This is a city that has a number of schools built without windows and the classrooms are built on the inside which was an energy and heat-saving architectural strategy from about 15 years ago. Therefore, task lighting would create a real problem in classes where there is no natural light.

Sonja Filipovic - Commercial

I'm thinking more office buildings rather than schools at the moment.

Wendy Herbert - Government

Again, for exterior lighting, I don't see a problem.

Sonja Filipovic - Commercial

Well we didn't see a problem with it, but certainly....

Wendy Herbert - Government

No, I was just asking, it wasn't pointed out...

Sonja Filipovic - Commercial

Yes, it was a consideration.

Walter Hardwick - Moderator

Okay. Now Irving Fox, have you identified anything as a householder that you believe that you should be able to sell this community? We are getting down to the real hard-nosed items now.

Irving Fox - Residential

The only thing that I have been able to find has been discussed before. There were some reservations about it. In the refrigerator and freezer categories, would it be possible to reduce the number of times the door is open by, say, one half? Now that would seem to me to be a possibility and that might make a significant contribution. I don't know how the rest feel about that.

Walter Hardwick - Moderator

Do you people agree?

Susan Ryan - Residential

It's a wonderful idea. But it would be very difficult to do with four teenage kids. We might be able to do it.

Fred Weber - Government

Mr. Chairman. The commercial sector could do something with the cooperation of our gasoline service stations. This is a small town and we could get by with two stations open per day. I believe the service station operators would cooperate. They would not lose their gas sales because they would make their gas sales on different days, and they make the same total gas sales over the week. This hasn't been discussed with the rest of our group. I think we could make a savings by cutting down at least one day a week at all the service stations. So we'd have about two of our four service stations shut down each day.

George McKnight - Government

I would really like to complement the attitude of commercial and residential, and certainly government, for some very serious things. And I see on the scoreboard that we are running pretty close to 22 percent. Now Mr. Chairman, I think that three groups have demonstrated a very strong position. I believe industry in town has got to take a position of accepting a one-month closure this year, and if that means appealing to the employees for increased production for when they are actually working, so be it. But, I believe industry has got to come down to agreeing to close one month a year. We need three percent more energy savings and we have less than ten minutes left tonight. I think industry has got to make some more concessions. If we can do that, I estimate with my calculator, that we should be able to pick up that three percent up.

Walter Hardwick - Moderator

Okay. Mr. Haviland has got a comment.

Bill Haviland - Industry

Maybe in the chemical and refinery area: they sell commodities that can be traded and you can replace supplies from other areas. I think it's possible that the chemical and refinery industry would accept the one month downtime.

Walter Hardwick - Moderator

Okay. We have a commitment.

Megan Szanick - Residential

I believe that the residents....

Walter Hardwick - Moderator

Just let me make sure that we know we've got a commitment on the refinery and the petroleum sector for a one month shutdown.

Fred Weber - Government

This again has to be on the basis of cooperation by the employees, such as was mentioned in the sawmill industry. But yes, I think we could do it.

Walter Hardwick - Moderator

Well, we all know that over here. It's obviously going to go to the union on your behalf.

Okay, I'm told that we are now up to 22.5 percent electric energy savings.

Megan Szanick - Residential

I think that the residential, commercial and industry groups should be going after the government. They are telling us they want to set an example for us and so far their savings are only 0.89 percent, and you are going after industry. Shouldn't we be going after government?

Susan Ryan - Residential

How exciting, biting the hand that feeds us....

Bill Best - Government

I think you'd have to look at percentages. I mean, we only have a very small base to work from.

Walter Hardwick - Moderator

That's right, government represents only six percent of our energy use to start with.

Sonja Filipovic - Commercial

Has government considered reduced heating?

George McKnight - Government

Yes, we did. It's in our speech.

Just very quickly, we did accept a number of energy cuts; but we didn't want to jeopardize public safety, emergency measures and essential services.

Bill Vance - Commercial

You are talking about a water energy crisis and it appears to me that a municipal swimming pool probably contains enough water to look after an awful lot of households over a week or a month. Why have you not addressed that issue?

Walter Hardwick - Moderator

You are a Resident too. Perhaps....

Bill Vance - Commercial

I am more than willing to give up the water in my hot tub.

Chris Ritchie - Residential

Well I am glad to see everybody is prepared to take the creature comforts from us poor common folk.

I think we'd be willing to entertain that, but what, Mr. Chairman, I'd like clarification on from my friends in industry, is the sawmills that have made a concession and chemical sector has made some concessions; is everyone sharing equally in this energy crisis? What about the Pulp and Paper operations?

Bill Vance - Commercial

There was a beginning of a commitment to go to the high-pressure sodium lights on an accelerated basis and I don't think that was picked up Mr. Chairman.

Bill Best - Government

Right, I think the high-pressure sodium should still be pursued.

Bill Vance - Commercial

And also I don't think we have all the compressed air savings in, Mr. Chairman....

Walter Hardwick - Moderator

They did make the commitment, but they don't think that we've tallied it from the official point of view.

George McKnight - Government

Have we got the compressed air in there as well?

Bill Best - Government

We can put that in the equation.

George McKnight - Government

Did you commit for compressed air, "Mr. Industry"?

Mark Williams - Industry

Yes.

George McKnight - Government

Fixed your compressed air leaks?

Mark Williams - Industry

Yes.

Walter Hardwick - Moderator

Yes, he's made that commitment absolutely.

Now, we've got to look at the residential and commercial sector to see where else we can go while we are checking out the others. Are there other things that make some sense?

Bill Vance - Commercial

We addressed the issue earlier about the dishwasher. For the life of me, I don't know why we can't handwash our dishes, particularly if we do have three or four teenagers at home. It behooves them to understand how the human hands can work as well as the dishwasher.

And in addition to that, perhaps we should look at washing our clothes in cold water.

Chris Ritchie - Residential

I'm glad to see our friends from commercial are ready to wash their diapers in cold water.

Walter Hardwick - Moderator

Now look. You see we are at 23.4 percent. We've only got a very short period of time. I've got to make a commitment. So we need to find out if there are really any crunch things that we can do to bring our electric energy use down further.

Sonja Filipovic - Commercial

I think the commercial sector has made some pretty significant contributions when you consider the cost that is involved in their energy savings. Our next step is to look at reducing employment levels. And now I have to say to the residents, "What are you going to do if we start closing our businesses every other day?" And that's basically what we are left with when you go over our list.

Bill Vance - Commercial

There are still major reductions available in the residential slate of options.

What's wrong with cold water clothes washing?

Susan Ryan - Residential

Well, we believe in that.

Walter Hardwick - Moderator

Have you included that one?

Susan Ryan - Residential

We've already approved that.

Walter Hardwick - Moderator

Cold water clothes washing.

Chris Ritchie - Residential

Under duress.

Megan Szanick - Residential

Have we approved no pool, sauna spa operation?

Susan Ryan - Residential

Yes we will accept that, too.

Megan Szanick - Residential

Okay.

Walter Hardwick - Moderator

No pools, spas,...

Megan Szanick - Residential

And no sauna operations either.

Susan Ryan - Residential

I wonder if the government sector might look at, in lieu of hot tubs, spas and comfort zones, the great value of incandescent lighting in the treatment of subacute depressives? In this latitude, we have a lot of winter time and short days, and they have proved at the University of Washington....

Bill Best - Government

How about efficient lighting and not incandescent lighting?

Susan Ryan - Residential

...if we in fact sit under lights for two hours a day, all joking aside, between 6:00 a.m.and 8:00 a.m. if you are a lark, or 8:00 p.m. and 10:00 p.m. if you are a night owl, to alleviate stress. In the hospital emergency...

Walter Hardwick - Moderator

Twenty-four point two (24.2) percent and counting. And there has not been another drop of water from the sky while we have been negotiating. Is the government going to help us on this? I mean, you told me earlier on that you want to show leadership. You want to show how strong the government can be.

Chris Ritchie - Residential

I think the politicians skimmed over what they were prepared to give up and I think we should get that clarified.

Susan Ryan - Residential

We pay taxes to have these things clarified. We'd like your clarification.

Walter Hardwick - Moderator

What else has he got?

Chris Ritchie - Residential

Only point eighty-nine (0.89) percent savings so far in government.

Walter Hardwick - Moderator

Nothing else?

Susan Ryan - Residential

That's nothing.

Bill Vance - Commercial

We took forty-four (44) percent out of ours.

Walter Hardwick - Moderator

Okay. Mr. Haviland has been sharpening his pencil. Tell us what you've come up with.

Bill Haviland - Industry

Well I am suggesting that we should put into the equation the conversion of another ten percent of the motors to high-efficiency models.

Fred Weber - Government

And you run how many motors, about 1200, 1400? Something like that?

Walter Hardwick - Moderator

Okay, so we've got the adoption of high-efficiency motors. What was the other item Mr. Haviland?

Bill Haviland - Industry

Lighting. I don't think the others are do-able.

Walter Hardwick - Moderator

The others are not do-able. Okay. So they've moved up the 3.5 percent industry savings. Now it seems to me there's been some movement, but we are now down to the last crunch and I would really ask residential and commercial people, because there are the greatest variety of things that can be dealt with, to really look now and sharpen your pencils and see if we can't achieve the mandatory 25 percent.

Sonja Filipovic - Commercial

Can I ask if the residential people will consider turning off their lights during daylight hours? Can we get that one? I mean that's pretty basic, just open a few drapes.

Bill Vance - Commercial

What about the toilet flush volume reductions of 1.04 percent? Again we are saving water and electricity. It sounds like a great combination to me.

Walter Hardwick - Moderator

Now Sonja, your point was to reduce light usage during daylight hours. Can I get a commitment from you people to go and advocate that to your neighbours? Yes or no?

Sonja Filipovic - Commercial

Yes, we will.

Walter Hardwick - Moderator

You are suggesting that they lower toilet flush volumes?

Megan Szanick - Residential

No.

Susan Ryan - Residential

How does that make an electric power saving?

Chris Ritchie - Residential

I'm not sure, maybe less energy used by the water treatment plant but anyway, it's a minuscule savings.

Is the commercial sector still going full blast six days a week?

Sonja Filipovic - Commercial

We've cut our store hours back 15 hours a week.

Bill Vance - Commercial

It may be a minuscule saving to Hydro but the problem is water. There's no water in the dams or anywhere that you can save water I think you made a major concession and a major inroad. I think you'd better look at it.

Walter Hardwick - Moderator

Okay, it's 24.47 percent.

Government, have you got something more?

George McKnight - Government

No. I've got a suggestion. Maybe industry could take a further 10 or 12 percent cut in lighting consumption. Twenty-five percent is suggested. There is a major saving possible. Can you cut your lighting bill in half?

Mark Williams - Industry

Well I think one thing we have to be very concerned with is safety for our employees.

George McKnight - Government

I recognize that we are in a crisis.

Mark Williams - Industry

I've already reduced our lighting load by 25 percent.

Walter Hardwick - Moderator

Have you guys in the commercial sector got nothing else?

Jim Savage - Commercial

Yes there is one other thing and that is a compromise suggestion for residential. There's no problem at all with venting your dryer indoors in the winter time. You put a screen on the end of the exhaust duct to catch the fluff and you probably can use the extra humidity in your house. That will take us over the top. What's the problem? And it adds all kind of heat to your house.

Walter Hardwick - Moderator

Okay, have you got that, the suggestion that you vent your clothes dryer inside the house.

All right, by adding those up we have now achieved 25.1 percent savings in our electricity consumption. We've done it! Congratulations!

Well, I would like to commend the representatives of the government, of the community, of industry and commerce for this job. By doing and being able to sell this to our neighbours and the people of our community; we are going to make sure that most people are continuing to be employed, that we are able to maintain our overseas markets and our domestic markets; but, we are also going to be able to handle the exigencies that have come from this four-year drought. I commend you all for your contributions. Thank you and I will report back to B.C. Hydro.

* * * * * *

Announcer

You have been watching an energy crisis special in which we have imagined an energy crisis so large that every community in British Columbia has had to immediately reduce its electricity consumption by 25 percent. Tonight we have seen how representatives from the fictitious community of "Prince James" have decided to make these electricity savings in their community. Although tonight's energy crisis was an imaginary one, let's not dismiss it as mere fantasy. We must always remember that hydroelectric power is a precious resource, something we should not take for granted. We must also remember that the amount of electricity we use is directly related to our lifestyle. The one affects the other. The purpose of tonight's program was to encourage us all to think more about this.

Exhibit 6-1

The Prince James *Chronicle*

The Northern News ··· 1999 April 1 ··· 50¢

Today's Weather

Unsettled weather will continue for the next three days. Mainly cloudy with a chance of rain and the occasional sunny breaks.

Detailed forecast on page 3

Energy Crisis Panel named

This morning, Mayor Phil Koster anounced that the Energy Use Panel has been reconvened to recommend how Prince James will reduce electricity consumption by 25%.

The EUP gained much public credibility last year when it held hearings on the use of energy by the City.

Representing the Residential Sector are: **Mrs. Susan Ryan**, homemaker; **Ms Megan Szanick**, student; **Mr. Chris Ritchie**, Policy Analyst with the Carrier Sekani Tribal Council; **Ms. Wendy Herbert**, Principal of the D.P Todd Secondary School; and **Dr. Irving Fox**, Professor Emeritus (Geography), University of British Columbia.

Representing the Commercial Sector are: **Ms. Sonja Filipovic** of the Business and Professional Women's Club; **Mr. Bill Vance**, Manager of Sears; **Mr. Jim Savage**, Community Economic Development Planner; and **Mr. Fred Weber**, Chairman of the Open Learning Agency.

Representing the Industrial Sector are: **Mr. Bill Haviland**, former Manager of Prince George Pulp and Paper; and **Mr. Mark Williams**, General Manager of Decker Lake Forest Products.

Representing the Government Services Sector are: **Mr. Bill Best**, retired B.C. Hydro executive; and **Mr. George McKnight**, former Alderman and Emergency Coordinator of Prince George.

The moderator and facilitator for the panel will be **Dr. Walter G. Hardwick**, Professor of Urban Geography at the University of British Columbia. Professor Hardwick has served for six years as a member of Vancouver City Council, and as B.C.'s Deputy Minister of Science and Education. He was the founding chair and Chief Executive Officer for the Knowledge Network.

Electricity Cuts Tonight

Reps meet to make tough choices

Prince James will be the first city in British Columbia to take positive action to limit its use of electricity. Anticipating the need to reduce hydro-electricity use, representatives of each sector of electricity consumers were chosen to decide where the cuts will be made.

Last night, at an emergency meeting of the Executive Policy Committee, it was decided not to impose an across-the-board 25% reduction on all users. Mayor Koster said that the EPC wanted to have a reading on how the cuts would affect each sector of the community and then make decisions based on inputs from the community. "We all have to face some major changes in our lifestyle," he said.

"We hope that the prompt and responsible initiatives of Prince James will be a model for the rest of the Province," Mayor Phil Koster commented as he announced the names of the people selected to advise how the supply of electricity would be allocated.

The Energy Use Panel has been re-convened to debate the situation and recommend to Council exactly how the electricity cuts can be made. Last year, the EUP was the driving force behind the development of the policy on civic energy consumption.

Albert helps his mother, Julia Koehler, set the thermo-stat back to conserve electrical energy. Albert said, "I don't mind wearing a sweater, and this will really really help!"

Snowpack Disappointing

Environment Canada reveals the worst Hydro-electric cuts are inevitable

The supply of hydro power will be severely curtailed due to the extremely low water levels behind the dams throughout British Columbia. Hopes that the spring snow melt would solve the problem were dashed today.

At a brief news conference, Environment Canada and B.C. Hydro issued a joint statement confirming the fears that last winter's precipitation was not sufficient to alleviate the problem of low water levels behind the utility dams. As a result, the supply of electricity will be limited in the coming months.

Hydro Spokesperson, Terry McCullough, explained how the water levels have been falling gradually during the four year

see *Levels* on page 2

Tonight the deliberations of the EUP will be televised on CKPJ starting at 8:00 pm. "The decisions which will be made will affect every household in the city. We want everyone to be involved with the process," Mayor Koster explained.

Drought caused by Sunspots

Science Provides Clues but no Cures to lack of Precipitation

Well known UFO expert and broadcaster, Larry Eskay, speculates that the drought is not due to carbon dioxide and the greenhouse effect. He says that the length of the current sunspot maximum, combined with the unusually large spots, are causing the drought.

Between 1645 and 1715 the sunspot cycle was interrupted by a long period of no spots. This resulted in global cooling. The River Thames in England was frozen over in the winter. "It was called the Little Ice Age," Eskay explained.

According to Eskay, exactly the opposite to the Little Ice Age is happening right now. This time we have experienced an unusually long period of sunspots. "The maximum should have occurred three years ago, and yet the sun is just as active now as it was then," he said.

Astronomers at the Mount Graham Observatory would neither confirm nor deny the connection between the sunspots and the drought. One astronomer, who asked that her name be withheld, said that everyone knows that the sun exerts an influence on the earth.

"We certainly know about the benefits of the heat and light," she explained. She said that no one knows how the sunspots influence us. "The cause-and-effect relationship has not been established," she concluded.

B.C. Hydro prepares for Energy Discussion

Tonight, on live television, the Energy Use Panel will decide how Prince James will reduce electricity consumption by 25%. In preparation, staff at B.C. Hydro have been analysing countless options for the EUP to consider.

Hydro Engineer, Ichu Cheng was sitting in front of a colour computer screen when he outlined some of the implications. At a key stroke, a pie chart appeared showing how the city uses energy. He explained that in Prince James, the industrial sector is the heaviest electricity user at 46% of the total consumption. This is followed by the Commercial sector at 26%, the Residential sector at 25% and Government Services at 3%. The total annual consumption of Prince James is 335,000 megawatt hours.

Cheng showed some of the ways that the cuts could be made. "If people set their thermo-stats to 15° that would save 1%," he explained. Cheng had his computer screen scroll through dozens of possibilities. "Most people take 7 minutes to shower. If they could halve that, it would save the city slightly more than 1%. Would they shower quicker, or shower with a friend?"

Other significant savings could be made by using only one refrigerator per household (save 1.3%), use small refrigerators (save 1.6%), use "Power Smart" approved appliances (save 1.3%), vent dryers indoors—if you could accept the humidity increase (1.8%), replace incandescent lights with fluorescent (1.5%), do not heat water beds (0.5%).

In the commercial and industrial sectors, most of the major savings would result from closing facilities for part of every week, or shutting down an operation for extended periods. Cheng pointed out that this would result in a loss of income and other impacts.

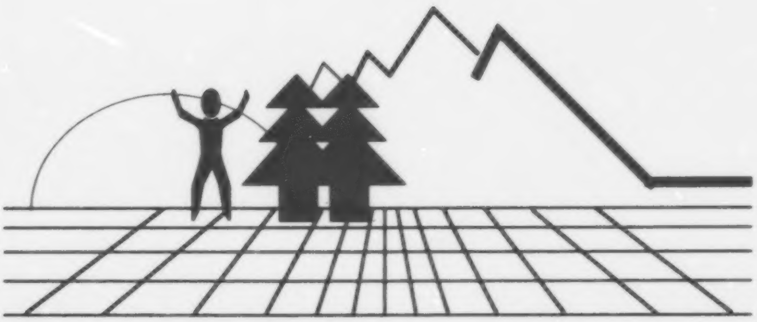
Cheng will act as a resource for the EUP during their deliberations tonight.

THIRD ANNUAL

ELECTRIC ENERGY

FORUM

Lifestyles, the Environment and Electricity Use



PUBLIC PARTICIPATION WORKSHOPS

Report Back From the Workshops Panel Discussion: Future Lifestyles, the Environment and Electricity Use

Nick Sonntag
ESSA Consultants

Chris Boatman

I'd now like to introduce Mr. Nick Sonntag. Nick is a senior partner with ESSA Consultants (Environmental and Social Systems Analysts Limited) and Nick has organized and coordinated this morning's workshop. He'll present a summary of the views you expressed at the workshop sessions. On behalf of B.C. Hydro I would like to thank you for your input to these sessions. So please welcome Mr. Nick Sonntag.

Tuesday Workshop: Future Lifestyles, the Environment and Electricity Use

Workshop Description

The briefing materials for the Third Annual B.C. Hydro Energy Forum included a detailed questionnaire on B.C.'s energy future and various strategies for meeting future electrical requirements. This questionnaire formed the basis for a morning of round table discussions. Groups of eight to ten participants discussed the issues raised by the questionnaire, a recorder summarized the group's thinking, and then each individual completed his or her copy of the questionnaire. The general comments from all groups were summarized the same day and presented to the Forum. The following report includes qualitative information from the group summaries and presents a synthesis of the individual questionnaire results.

Workshop Participants

The ideas and perceptions presented here are those of 109 of the attendees who participated in the Workshop. Thus, they do not necessarily represent an accurate cross section of the opinions of B.C. residents. However, the participants did represent a broad spectrum of regional viewpoints, special interest affiliations and occupations. About 50 percent of the participants came from the Greater Vancouver Regional District, about 10 percent from the Prince George area, and about 10 percent from the Greater Victoria area. The rest were from locations scattered throughout B.C. About 40 percent were affiliated with crown corporations, and the rest included various levels of government, business, environmental and citizens groups, educators and other professionals.

The participants were asked to evaluate their personal energy consumption patterns. Most rated themselves as being about average or a little below average in their total use of energy products and services. However, about 40 percent rated their residential energy use and 30 percent rated their transportation energy use as well below average. Whether or not these self-ratings are accurate, the answer does indicate that the participants view themselves as being frugal energy consumers.

At What Scale is the Concern?

Implicit in the assessment of every energy or environmental issue is the perception of the level at which each issue is considered to have become of overriding importance. For example, some issues are local and others are regional, and some, such as climate change and the necessary international agreements are significant on a global scale. Scale was not explicitly discussed for each issue, but participants were asked to priorize their scale of concern as it related to environmental protection and electrical planning. This was a difficult question to answer as it depended on many imponderables. Nevertheless a pattern, which was further elaborated in the roundtable discussions, did emerge. (See Exhibit 7-1.)

There was a consensus that local action offered the best avenue for achievement of improvements to the environment. People also stressed that there was a need for coordination - one has to "think broadly and act specifically", which usually means locally. However, for major international problems such as acid rain, this means "think globally", and in other cases it can mean "think provincially". Of the four scales discussed, North America-wide thinking was evaluated as having the least likelihood of success for implementing improvements to environment/electricity issues. A large-scale view was seen as an antidote to a narrow approach where everyone wants to receive the benefits, but no on wants to accept the costs (as in NIMBY or "Not In My Back Yard" thinking).

Perceived Futures

The magnitude of future environmental impacts resulting from electrical development was clearly related to growth in demand. Demand for electricity is a function of general economic conditions, energy-use patterns and the number of users. Participants were asked to predict growth rates for the economy, the population, and for electrical demand over the next decade in comparison to growth rates during the last decade.

The consensus was that the economy was expected to continue growing at the current rate. However, the growth rate of electrical demand was expected to decrease, whereas the population growth rate was expected to increase (Exhibit 7-2). The reason for the expected population increase was anticipated high immigration from Asia, Eastern Canada and the United States. This high immigration would contribute to the provincial economy, and there would be a noticeable diversification of industry toward high-tech and service sectors and away from the resource base. A number of people indicated that they expected that high real estate prices in urban areas and the free-trade relationship with the United States would both have a significant impact on the economy over the next ten years.

Electrical demand of individual customers was expected to decrease, mostly as a result of energy conservation measures. In part, this would be attributable to more efficient technologies. The few people who felt that total provincial electrical demand would increase were thinking about new thermo-mechanical technologies for pulp which require large amounts of electrical power. Overall, it was felt that the pressure to conserve and the environmental ethic are going to be a very strong force in society. Some felt that the total electricity demand in the Province could go down even though the population was increasing.

Opportunities for Conservation

In order for demand to go down as predicted, further energy conservation savings would have to be realized. Where are the opportunities? According to the participants, all sectors - commercial, industrial and residential - are perceived to have a medium to high potential to conserve energy, with a marginally greater potential in the commercial sector than the other two.

Participants were also asked to make specific recommendations for conservation measures by the residential, industrial and commercial sectors.

Many suggestions were made for residential energy savings. People proposed lowering the temperature of their homes, and adopting a more cost-effective heating system such as gas space heating rather than electrical baseboard heating. Adoption of more efficient appliances, and greater use of natural light in the home were also recommended by many.

Waste recycling was strongly supported as something that must be done at both the individual level and the community level. Associated with this were recommendations to reduce the amount of packaging material, because about a quarter of the waste we now throw away is the material wrapping the items we purchase.

Suggestions for the community included a dramatic shift in municipal planning, which could serve as a driving force to encourage the adoption of smaller homes. Several comments were made suggesting that the large 6,000 square feet homes currently being built are not appropriate to the emerging conservation ethic. More efficient transportation systems such as mass transit were recommended. District heating by steam should be considered in smaller communities so that everyone could benefit from the same heat source. Even community hot tubs were suggested!

Opportunities for electrical conservation for industry were also of interest. More efficient technologies, such as more efficient motors, were perceived to be the major mechanism available to industry. Improved building codes that require more insulation and the use of natural light were also recommended. Several groups expressed concern about the potential electrical energy demands of thermomechanical pulp production. An efficiency audit as a prerequisite for electrical connection of a new company was proposed. Finally, cogeneration was seen as an energy-efficient opportunity available to some industries.

Commercial users would be able to conserve not only through more efficient buildings (again, by enacting building codes mandating greater use of insulation and adoption of more efficient lighting were recommended), but also through reduced hours of operation and adoption of individual rather than bulk metering of electricity use. One group proposed fewer shopping malls and a more widespread distribution of stores and services.

The importance of education came up in all three sectors. People's attitudes toward energy conservation could be improved through programs in the schools and in offices. In order for industrial and commercial energy efficiency to be implemented, managers would have to become aware of the benefits of conservation so that they would support and direct changes. Conservation education need not be limited to promoting energy efficiency, it could also promote less resource intensive lifestyles.

Suggestions made by people were tabulated, analyzed, and grouped according to the major conservation methods proposed. (See Exhibit 7-3.) Efficiency was foremost in all sectors, particularly in the industrial sector. Conservation and education was mentioned for all sectors, but the residential sector was seen to be most critical as choices made there must be made at the individual level.

Promoting Conservation

What can be done to promote conservation? The questionnaire proposed three approaches: rationing, pricing and voluntary conservation, for which the participants were asked to indicate their preferences. (See Exhibit 7-4.) There was an almost unanimous feeling that rationing of electricity is not appropriate for British Columbia and it should only be adopted in a crisis. It was mentioned that rationing is a totalitarian-type approach, and that furthermore electricity is the best form of energy so we should not penalize its use. There was strong support for voluntary conservation, and a desire to encourage conservation through adoption of an appropriate pricing structure.

Pricing was seen as an unexploited strategy for encouraging conservation and efficiency. This strategy should take into account the real cost of energy including the full social and environmental costs of power development as well as the costs of production and distribution facilities. Time-of-day pricing was recommended as a means of shifting loads to a more even daily pattern of energy use. Some people proposed an inverted rate structure which would charge increased unit rates for increased usage. A number of suggestions were made as to how this could be accomplished, including a flat base up to a certain usage level after which rates would increase, or a per capita allowance at a base rate. It was also felt that pricing should be allowed to track the full marginal costs of new generation. A general opinion was that some form of pricing review which rewarded energy efficiency should be encouraged.

Who should suffer the increased rates? There was an almost unanimous consensus that industrial and commercial users should accept the majority of electric rate increases. There was, however, also a suggestion that a "green tax" on residential hot tubs should be enacted. Concern was expressed for low-income customers; perhaps some form of beneficial pricing structure could be devised for them.

Many avenues were seen as available for making voluntary changes which would effect conservation. Many changes in lifestyle were suggested; these were grouped into three categories. (See Exhibit 7-5.) A number of people suggested voluntary insulation programs to reduce energy loss, and others recommended individual choice of more efficient technologies, appliances, motors, lighting, etc. The third category, mentioned by fully two-thirds of the participants, was a fundamental approach to voluntary conservation: namely attitude and education. Forum attendees recognized that without these basic changes in outlook, voluntary conservation would not be possible. Some even felt that we will have to stress people so that they will overcome inertia and make lifestyle changes. In general it was felt that there is a very strong ethical push to promote conservation.

Sometimes people are prepared to make suggestions for others yet are not prepared to follow these themselves - an attitude wherein they do not recognize that responsible action begins with oneself. Such an attitude was definitely not evident with the participants in this workshop. These people not only considered themselves as currently more conservative in energy consumption than the average, but also they felt that they could make further reductions in their personal energy consumption. The area that they, as a group, were most interested in reducing their energy consumption was in transportation. Residential use came next, and almost a third of the participants were willing to reduce their consumption of energy through the purchase of more efficient products and services. (See Exhibit 7-6.)

Preference for Supply Options

Even though the rate of growth in energy demand is expected to be slower in the next decade than the last, some growth in demand is still anticipated. Thus the question of supply comes up; how is this demand going to be satisfied?

Participants were presented with an array of 18 different ways of providing additional electric energy and were asked to rate all of these with an overall assessment and on social, acceptability, environmental acceptability, and on relative cost. This was quite a complex task, and generated a lot of discussion. Some clear distinctions did, however, emerge. The two most strongly favoured supply options were Resource Smart and Power Smart; both received an equally high rating. The least acceptable were coal, hydro from undeveloped river basins, and nuclear - the first two particularly for environmental reasons and all three for social reasons.

In order to simplify the presentation, the conventional supply sources, hydro and thermal, will be discussed first, followed by the alternate and emerging technologies. For all sources the overall preference reflected the other evaluation categories (as it should) and was particularly closely correlated to social and environmental acceptability. The figures below represent the group's response in the "overall liking" category, and the comments will refer to any changes in the pattern with respect to the other evaluation categories.

As already mentioned, Power Smart and Resource Smart were highly preferred options. (See Exhibit 7-7.) Coordination with neighbouring utilities was also supported, and it was considered a particularly favourable alternative with respect to cost. Small hydro developments and further development of the Peace and Columbia river basins were considered generally acceptable, although more beneficial socially than environmentally. People felt that since we have already developed most the Peace and Columbia rivers we should continue developing these rather than shifting to new basins. This preference was also reinforced by a strong environmental unacceptability expressed for dam construction in undeveloped basins.

Other than tidal, all alternate and emerging technologies received a medium high rating with respect to their social and environmental acceptabilities. However, their relative costs were expected to be high, reducing their overall ranking to the medium preference range (Exhibit 7-8). The exception to this pattern is municipal solid waste combustion, which was perceived to be cost-effective but somewhat undesirable socially. Comments were made specifically with respect to the location of an MSW site in Burnaby. This site is definitely not popular, particularly because of expected emission problems.

People felt that solar generation of electricity might be appropriate for some local situations, but that wind generation is not generally practical in British Columbia. However, both of these energy sources had particularly high environmental acceptability, so their general assessment was rated as positive. Tidal power, the only alternate/emerging technology with a low overall rating, is perceived to have a low environmental acceptability as well as having a high cost.

Several roundtable groups felt that we need to encourage a diversified system of electrical supply. There was concern that focussing on one particular source could make us more vulnerable to unexpected market changes in the future.

Reliability, Price and Environmental Protection

Participants were asked to rate three important factors in providing electricity; reliability, price and environmental protection. Workshop attendees responded that they felt that protecting the environment and having a reliable electrical supply are about equally important, and both are more important than price.

Participants were also asked to elaborate on their concerns regarding the reliability of electrical supply. Reliability was rated as very important for industrial customers, whereas the importance of residential reliability was rated medium high by most participants. Some, who rated residential reliability as being very important, found any outages, even of short duration, to be annoying and stated that reliability to them was important for household living. Interestingly, those who rated residential reliability as least important also reported a higher number of outages. On the other hand, those who gave reliability the highest importance ratings reported experiencing outages with the longest durations. Apparently power outages that last only a short while are relatively tolerable.

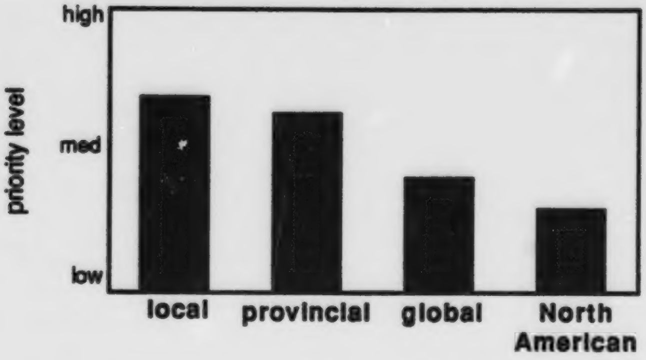


Exhibit 7-1 Perceived relative priority of various scales of concern for environmental protection and electrical planning issues.

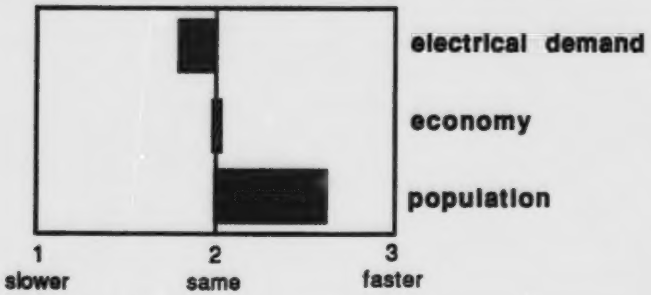


Exhibit 7-2 Predicted growth rates for the population, economy and electrical demand in British Columbia.

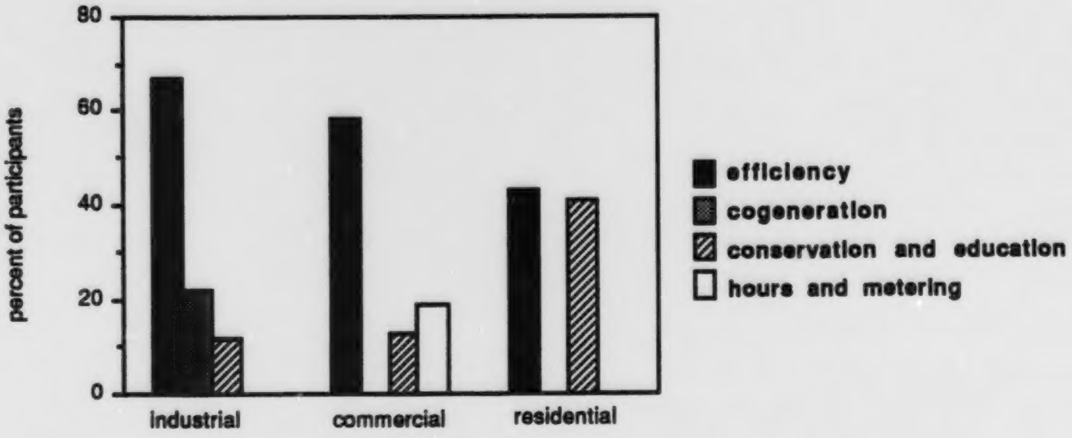


Exhibit 7-3 Suggested methods for conservation available to each sector.

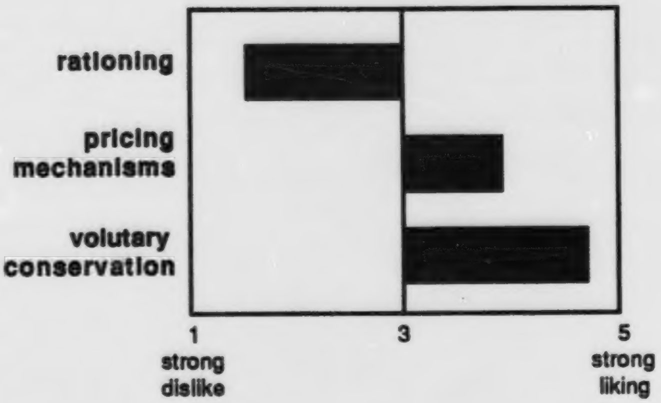


Exhibit 7-4 Preferences for methods of promoting conservation.

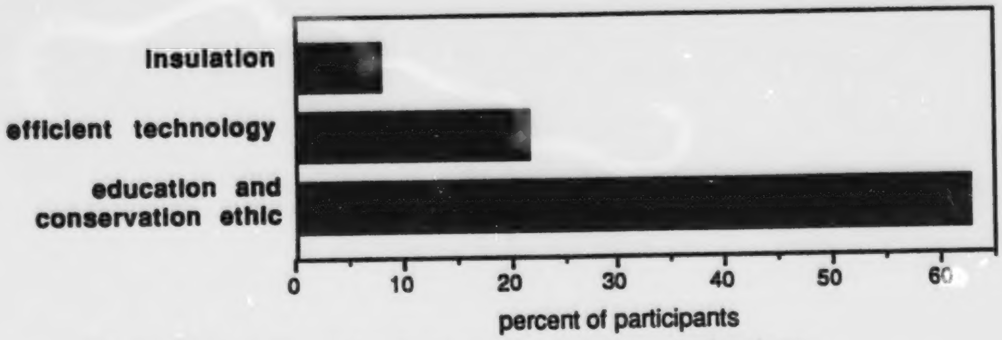


Exhibit 7-5 Suggested voluntary conservation mechanisms.

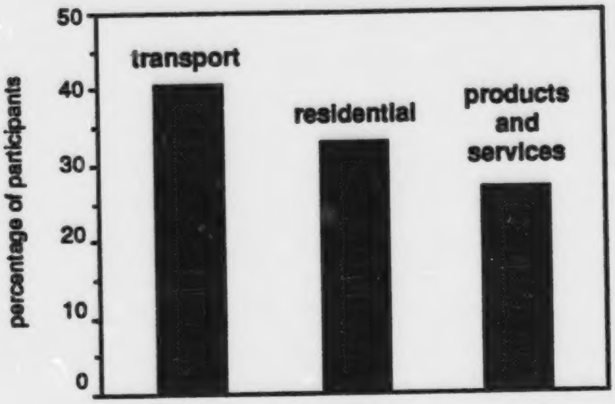


Exhibit 7-6 Areas that workshop participants would be most interested in reducing their personal electricity consumption.

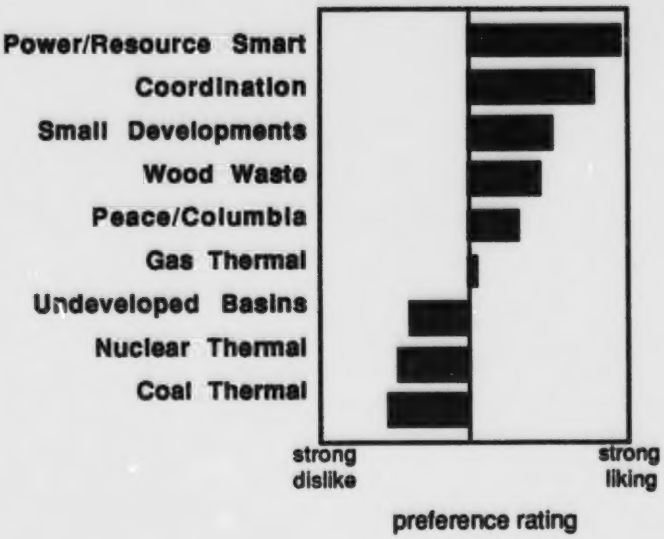


Exhibit 7-7 Preferences for Conventional (Hydro and Thermal) options for increasing electricity supply.

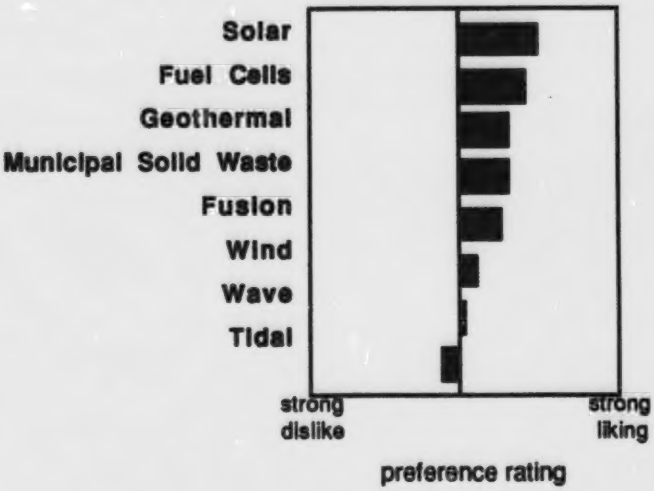


Exhibit 7-8 Preferences for Alternate and Emerging Technology options for increasing electricity supply.

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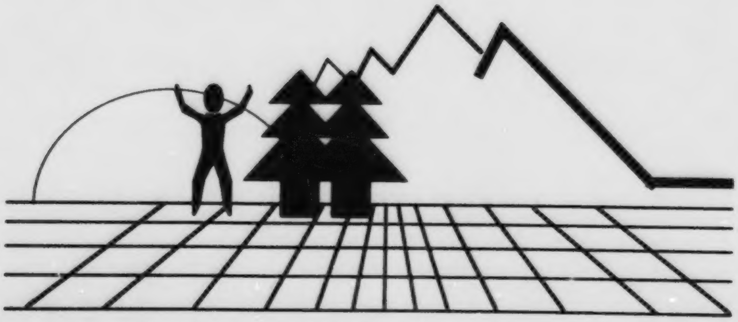

LUNCHEON ADDRESS

Luncheon Address

Introduction To
The Honourable Jack Davis

John Whitmer
President and Director
Balfour Forest Products

Introduction of The Honourable Jack Davis by John Whitmer

Thank you very much. It's a great honour to be able to introduce our guest speaker who is our Minister of Energy, Mines and Petroleum Resources, Dr. Jack Davis. Jack has been with the cabinet from about 1976, and probably knows the ins and outs of our Government both here in B.C. and Federally better than most people. I think that Jack has been the creator of many good things for this province over the years, and has been a strong Cabinet Minister. Jack, we appreciate what you've done for this province.

I am going to give you a brief history on Jack's background and tell you about some of the things he's done for this province. Jack is an engineer. He's an economist. He's a former member of the Federal Parliament. He served as Federal Minister of Fisheries and Forestry and Minister of Environment. Provincially, he has served as Minister of Transportation and Communication and as the Minister of Energy, Mines and Petroleum Resources. That was quite a mouthful; but, I think he was doing three men's jobs during that period. Jack was also a Rhodes Scholar and is the author of several books. He was chosen as Canada's Engineer of the Year in 1975.

I am very pleased to introduce the Honourable Jack Davis.

Luncheon Address

New Directions in Energy Policy in British Columbia

The Honourable Jack Davis
Minister
Energy, Mines and Petroleum Resources

Thank you John for those kind remarks. I'm sorry I wasn't here yesterday or here through the morning session because I gather I've missed a lot. I am perhaps in the position that George Bernard Shaw liked to be in when he began a book. He stated that he didn't want to prejudice his mind by reading anything on the subject that someone else had written. I don't have a written text here; but still, I do want to address some of the topics which I understand you dealt with effectively today or will be dealing with later today.

"New Directions in Electricity Policy in British Columbia." What's different here in British Columbia? We have scope to be different because we have got an adequate supply of electrical energy from a variety of sources. Some of them are low-cost sources; therefore, we can maintain low prices for some time to come.

That can be a problem as well as an advantage. At least it's comfort to consumers that prices are not way out of line with other things. For the next decade, our prices probably won't rise as fast as inflation or the price of other goods and services. But it presents us with a problem. We've got a resource, electricity, which is next to free. It's out in the market place at a relatively low price, compared to what the market could afford to pay. This is the case because it's delivered by a regulated body which is obliged to deliver power at a price which reflects its historical financial costs and little else.

We are also beginning to struggle with the term "sustainable development". The concept, in many ways, isn't new. It's certainly well-known to the forest industry, and those who are concerned with sustainable yields from our province's forests, and with sustainable yields in the fisheries. Generally speaking, renewables are harvested to ensure sustainability. There's an understanding, at least a feeling, that there is a limit to the amount these resources will yield. Hence there's a limit to the amount of capital that should be thrown at them and there must be a limit to the rate of harvest. In other words, there are parameters, physical as well as economic, which limit the extent of resource activity.

On the energy side, we really don't have the same kinds of parameters. Some of our terminology is misleading. We talk about renewable resources and non-renewable resources rather loosely. I'm talking about the wide range of energy commodities that have been referred to as "non-renewable", in other words "exhaustible". If you really stand back and look at this universe, there's one thing that is abundant and that is material resources, in the sense of minerals and, indeed, energy itself. There aren't the same obvious limits as there are to the yield we can obtain from our forests or from our fisheries, the so-called renewable ones. There is a limit in respect to the amount of water power we can develop. That limit is currently being set much more by environmental, tourism, and other considerations than just by the narrower economic considerations.

I said at the beginning, that we have an abundant electricity supply, at least potentially. If the demand is there, we have an incredible resource. We have completed, or nearly completed, the development of only one river system in British Columbia - the Upper Columbia. There are still damsites left on the Peace River. We haven't touched the Fraser at all. We haven't touched the Stikine, or the Nass, or the Skeena, or the Liard. There are other smaller rivers and streams that can, in some measure, be harnessed. The hydroelectric potential, if one puts aside environmental concerns, is probably three or four times the capacity that's been harnessed to date. When we come to other means of generating or producing electricity, we have large amounts of wood waste which we are beginning to utilize more efficiently, and more productively. We have cogeneration developments now in our pulp mills and some of our sawmills. We will undoubtedly be generating more energy from municipal garbage in the near future, particularly in the Lower Mainland. In addition to hydroelectric resources, there is a great potential for thermal electric generation from waste. In some considerable measure, these are all renewable, sustainable activities.

The least-cost power in British Columbia is from natural gas at today's field prices. It can be consumed in combined-cycle plants, really off-the-shelf type plants, which can be bought at relatively low cost. Presently, the price of thermal power is below, say, the cost of bringing in Site C. In terms of gas we've got a proven 30-year supply. We've got probably several times that order of magnitude of natural gas in the Territories, and indeed in the Arctic Islands; there's no foreseeable real limit to the availability of natural gas. Natural gas can be used for a variety of purposes, including the generation of electricity. It is also possible to generate electricity from coal. Coal in nature is much more abundant than either oil or natural gas. So as far as thermal energy is concerned we've got another backstop with coal which, if it isn't absolutely renewable, is certainly available in a large quantity, for the time being, at fairly low cost.

I guess our largest single resource in terms of cost or price is demand-side management. Hydro has certainly gotten down to this by starting to educate the public and industry to use more efficient equipment in order to get the same or better results than would be possible by building more generating facilities. Potentially, demand-side management can, over the next decade or so, result in energy savings equivalent to Site C. So there's an important resource at perhaps half the cost per kilowatt-hour of Site C, or less. So demand-side management is, in its own way, an important resource.

We've also got the cogeneration opportunity I alluded to earlier. If we have a dozen cogeneration developments at the big pulp mills, and at sawmill complexes like Williams Lake, they would, together, be equivalent to half a Site C, or in that order. There's an opportunity there for the private sector to do a job for itself, to generate much of its own energy from waste wood, and be able to sell whatever surplus it has to Hydro.

Hydro's "Resource Smart" studies tell us that Hydro can, in a sense, re-engineer some of their dams, e.g. dig out tailraces, improve the flow of water through penstocks, add generation at existing dams and so on. In this way, perhaps, they can save the equivalent of half a Site C. Again, it would cost much less than building a completely new power facility with all its related transmission and other facilities. So this is another significant resource.

We've got the possibility, and indeed we've already have an example with Alcan, of private power producers being able to generate additional power, and then selling it to Hydro, at least for the mid-term, and then later switch it to other industrial users. The Alcan expansion at Kemano is equivalent to about two-thirds of a Site C at perhaps half the cost in terms of cents per kilowatt-hour. That development is proceeding, and it's an available resource. A 20-year contract has been developed with Alcan for B.C. Hydro to draw on that relatively low-cost energy starting in 1995.

So we have abundant resources without having to put another dam on a major river as we did in the past. We can go many years into the future knowing that the cost of that additional capacity will be less than our projected costs of building large dams, and their associated major transmission lines, as was customary in the past. We have reasons, at least on the cost side, to expect electricity in this province will continue to be a bargain. It's going to continue to be available at a price well below electricity in other areas, such as in the State of New York or Southern California. Indeed in the last few years our electricity rates have become more competitive relative to Ontario and Quebec. Those provinces did have lower cost power than B.C. in the past. However, we built, perhaps you would even say over-built, in the sixties and seventies, and now as we are beginning to fully utilize that capacity, and as its capital cost is increasingly written off, our costs and our prices are becoming lower than theirs. From a strict energy cost point of view, this is a very attractive part of the world in which to live - we have low-priced energy.

We have a further bonus from the downstream benefits arising from the Columbia River Treaty. Around the year 2000, energy in excess of that proposed for Site C will become available to us in this province. Incidentally it's these downstream benefits are a resource of the people of the province, not B.C. Hydro's; but Hydro keeps a watchful eye on the downstream benefits, which are substantial in amount. They must be delivered free of cost to the international boundary line by the Americans. This energy, to which we have title, is generated and is presently used in the United States. Under the Treaty we sold our entitlement for a 30-year term. We can begin to bring energy back around the year 2000 at no environmental cost and essentially zero financial cost. The generators are up and running now. The development has already taken place. We really are in the midst of plenty of energy and the cost picture is really attractive.

On the market side we have a problem if we want to encourage conservation. One of the traditional ways to discourage use is by increasing the price of a commodity, so people begin to reduce their consumption in order to save money. But this is very difficult, at least if we continue to manage our power in the traditional way, where electricity is essentially delivered at cost plus a sufficient profit to attract capital. This results in a price that's perhaps a fraction of what the market really would be prepared to pay if power was in short supply and the market worked in its expected manner.

One of our difficulties is that the power business, and to quite an extent the natural gas business, is regulated. It's regulated so that price reflects little more than costs. It's regulated because the principle operator is a utility, which is a natural monopoly and doesn't have competition. It's regulated by a government body which historically said, "You demonstrate cost, we'll grant you a rate sufficient to cover costs, and that's it." We are trapped in an institutional arrangement which sees a very valuable commodity, electricity, sold at bargain-basement prices. This approach to regulation is consistent with practices used, not only on this continent, but elsewhere.

In British Columbia we have taken several steps so that our policy is allowing us - and this is certainly true for natural gas, and will be increasingly true of electricity - to confine the essential operations of the monopoly utility, and that's principally B.C. Hydro in this province, to a core market. The core market is the market comprised of you and I in our homes and small businesses that really have no possibility of using an alternative source of power. The core market is the market that belongs solely to the utility. The utility must build in order to cover that core market's needs. Hydro has built to serve the core market as well as the rest of the market. Hydro has served large industry and quite a few of these companies could well develop their own energy if they had to or if they were given an opportunity to do so.

In future, Hydro will serve the core market and will also serve any industry that wants to buy energy from Hydro. I'm thinking now of resource-processing type industries like pulp and paper, metal refining, cement manufacturing, and so on. Those industries which are not in the core market will now be able to supply their electric energy needs by buying from Hydro or buy it directly from a private power producer under negotiated terms and prices. It's much easier to finance a new resource-processing activity if you know what your power and energy costs are likely to be, if those costs are under control, and if they are captured by the contracts which you have been able to sign with a producer. Alcan could well be one of those producers. Alcan, in addition to expanding its aluminum refining capacity, may well be serving certain industries by selling them power, not on a short-term basis, not at rates that can change from year to year as a result of regulation and inflation, but at a fixed price which the two parties can agree upon. The opportunity is there for other independent, private or investor-owned concerns to generate their own power, put up their own power dam, or more likely their own thermal plant, or their own cogeneration facility and sell the surplus power to an industry nearby. They could also sell to industry at a distance because Hydro is going to permit the wheeling of other people's electricity across their transmission Hydro system. However, Hydro must be fully compensated. There would not be any subsidy. Hydro might be able to make a reasonable profit on occasion, over and above its basic costs. And of course there would be no displacement of Hydro's existing customers.

The wheeling opportunities in the natural gas business have resulted in substantial contracts being written where the user-industry goes to the field, buys the gas, owns the gas itself, owns the gas in the pipeline and has an assured supply for 10, 20 or 30 years. That gas is wheeled through the pipeline system. The pipeline company today, the main transmission-line companies on this continent, are common carriers. They no longer own much or any of the gas moving in their pipelines.

Now, on the electricity side, Hydro will own most of the electricity moving in its power transmission grid, but it might have to add some capacity or utilize excess capacity in a wheeling arrangement (that is, electricity which could well be generated by a private producer and which is sold directly to an end-user close by or at a distance from that independent power producer's plant and transmitted over the transmission lines of Hydro).

With respect to pricing, you can end up with two price scenarios. One is where Hydro has its costs averaged over the entire province for all its facilities and prices set at average cost for different categories of users. This results in the same price for a home, a factory or a store in Vancouver as it is for a similar customer in Fort St. John, in Prince Rupert or in the East Kootenays. This is known as postage-stamp pricing. There's no locational advantage, at least from a price point of view, when buying power from Hydro. There's no locational price advantage in terms of electricity costs of locating in one part of the province or another. There may be other locational advantages. For example, the timber may be there or the ore, or the manpower, and so on. Hydro is neutral insofar as the location of industry is concerned. Its rates will rise more or less with inflation; but, it is certainly neutral insofar as different uses are concerned and certainly insofar as regional development is concerned.

The other scenario is that the private sector companies can take advantage of a low generating cost in a certain location, capture those costs and sell nearby or in another location at a price, which may well be quite different from Hydro's price. If there are lower costs in a certain location, say in Northern British Columbia, then these lower costs can be taken advantage of. The turn-up is low price, and the low price is going to attract industry to the vicinity of that new electrical generating plant. So you can have regional differences, locational differences, in costs and prices through the private sector side; but, you don't have it through the utility which basically serves the core market. The utility serves the little people, and serves large industry if large industry doesn't want to go out on its own. Henceforth, and really beginning a couple of years ago, large industry could take advantage of some low-cost regional power development by locating its industry nearby. This essentially has to be good news in the north, particularly because we do have some unique resources up here; low-cost resources, like gas, which is lower in price in the field area as opposed to way down south. Hydroelectric sites, which could produce a unique local price advantage if developed by private industry, would not provide the same local advantage if Hydro developed them, as these site costs would then just be averaged with all of Hydro's costs. Those resources could be developed privately and result in a magnet, if you like, for industry, because if the local cost is low, the price can be low. Contracts that would be developed would not only envision low price but could provide several decades of continuity or a degree of firmness which makes the overall investment much more viable for the private sector. That's one, if not the main reason, why we are encouraging private sector participation in the power business. It is certainly one of the opportunities we have here.

Early power development, in this province, was to serve local needs, e.g. Cominco and Alcan. B.C. Electric produced power initially to serve a local electric railway in the Vancouver area. These were private-sector power producers. There was some variety in rates and certainly in costs; but, when Hydro took over the B.C. Electric Company in the early sixties, Hydro became the only entity to develop power. This was the attitude of the government at that time. It was the ambition of the day to go big, to build big, to build megaprojects, to build for the long-term, and to average all the costs through one instrument of government. Hydro had the field totally to itself in the sixties, seventies, and a good part of the eighties. It's not the only game in town any more, but obviously the entity which owns, controls and operates the major grid is the big boy on the block and will remain so. For political and other reasons, I can't see a government in Victoria selling off a hydroelectric installation. Water, in the public view, belongs to the people. The rivers and riverflows are ours. To sell them off, especially if there was any prospect of price increases, would simply be bad politics. So Hydro is secure in that sense. It is secure in the sense that it is the big utility. It is the entity which will serve the core market, the little people of the province for a long time to come.

I've referred to the fact that our costs are low, and that our prices are low. From the point of view of convention, they are probably too low. Some would say far too low. How do we go from the politically attractive situation where we enjoy low attractive rates to a situation where the price of electricity is used in some measure at least to bring about conservation and cause people to use electricity more sparingly, or use it only in those applications which make sense from an overall energy point of view?

You know we really shouldn't use electricity at all for space heating. If you simply measured electricity as a source of sensible heat in Vancouver, Victoria or other locations, against the cost of natural gas - natural gas would be cheaper. Natural gas delivery involves about a quarter of the capital investment as electricity to begin with. There is very little ongoing operating costs for natural gas because once the reservoirs are found they function on their own with one or two people manning the valves and that's it. So space heating should increasingly be a market almost exclusively served with natural gas which is clean and inexpensive as opposed to electricity which is clean but relatively expensive. There are many applications, particularly lighting or turning wheels, where there is no substitute for electrical energy. Those markets and their needs will be served more and more, but in a focused way, by Hydro and the private power companies.

How do we get the price up? We're determined to regulate B.C. Hydro more along the lines that private utilities traditionally are regulated on this continent and elsewhere. That is, they demonstrate historic cost and then they can get a return on their investment which is normal for the industry. Call it a regulated rate of return. If they have to expand, they have to have a profit to be able to attract fresh money. There's a bit of discipline there.

In the past Hydro has been financed 100 percent by the sale of bonds and the Company's main cost is the payment of interest. The book value of Hydro's investment is slowly depreciating; it was in the order of $10 billion and it's between $6 and $7 billion now. It's true that the market value would probably be triple that, at between $15 to $20 billion if it was sold as an unregulated company. What about this situation? Hydro's major cost is interest. Its interest burden is declining. Its costs are declining. Its rates should be declining in line with those costs if we are traditional in regulation. It's not paying a dividend to the province, as the shareholder. It's not paying any money over and above interest. We are inevitably in a spiral that's moving the wrong way. Lower and lower costs, listed in bookkeeping terms, lower and lower price, and more and more wasteful use of electricity.

If we were to follow the private enterprise model, and we've grounds for doing this, we'd see Hydro, not only having a debt ($6 to $7 billion right now), but also equity. As it happens, since the early sixties, the people of B.C. have gifted $1.5 to $2 billion to Hydro and never received a cent of return. That's now what's being called the "equity" in Hydro. And the government has thought: why not get a return on the equity? It would be paid into the government's coffers in the form of dividends. It would tend to keep the price up a bit; but, nevertheless, I think one can make a good argument that there should have been a return on the moneys gifted to Hydro. The initial lump sum payments for downstream benefits, for instance, and the Columbia River Treaty, were all gifted to Hydro. They didn't have to raise those $300 to $400 million dollars on the open market. There was no interest charge for those monies, as it is part of the equity which the people of British Columbia have in Hydro.

A dividend, following a private sector model, makes a lot of sense and that dividend essentially will be going to the coffers of the government to be spent on hospitals, or schools, and other public facilities and services. This is not in the traditional way of running Hydro or the way the books have been recorded and administered, or the way rates have been set. We now have the dividend concept in place. Hydro, as long as it's not having to expand it's capital plant, will be able to pay a growing dividend.

Hydro has to now meet several financial criteria. It's interest cost coverage has to be 1.3. In other words, its net revenue has to be at least 1.3 times its interest expenses. Hydro has a target debt equity ratio of 80:20, that's 80 percent debt and 20 percent equity. If Hydro can get down to 75:25 or even 65:35, which is more the norm in utilities across North America, it could borrow money more cheaply. The government has been able to borrow money more cheaply than Hydro because Hydro's 100 percent debt financing is generally regarded outside of this province as risky. There's no cushion. Now as Hydro moves to a decent debt-equity ratio, it will be in better shape financially and may be able to borrow at lower interest rates. The government which has always guaranteed Hydro's debt may also be able to borrow at lower interest rates. If this move only resulted in, say, a tenth of a percent decrease in interest rates, then this alone could be worth several hundred million dollars a year. I think one of the better reasons for going to this model, which is the traditional model for utility financing in North America, for Hydro, is that it is good business. It's certainly reducing debt charges paid by the people of the province, and other consumers of B.C. Hydro's power.

I'd now like to turn to a couple of other aspects of development. In particular, we have to pay increasing attention to environmental impacts. One of the reasons why it will be difficult to dam more rivers in the province is the increasing concern about the control of wild rivers to an extent which may be otherwise harmful to the environment or to tourism. Some of the developments being proposed by the private sector will provide a net environmental benefit to the people of B.C. There's a power development at Williams Lake where construction is about to begin by Northwest Energy. Essentially this development eliminates the use of beehive burners in the area. This project uses all the waste wood to generate electricity which will then be used in part locally by industry with the bulk being sold to B.C. Hydro. Now, as it turns out, their overall cost may be less than Hydro's long run marginal cost, it's less than Hydro's cost of developing energy from Site C, for example.

The province has directed Hydro to pay a premium on the purchase price of electricity from the Williams Lake project which contributes to cleaning up the environment. The premium payable is limited to 15 percent of the cost of the power. That's the maximum. Indeed, this project may not need that bonus in order to fly. This payment by Hydro comes off the dividend that it will pay to the government at the end of the year. It's really the taxpayer of the province that will foot the bill. There are quite a few situations in the province where there's chronic pollution like that from Williams Lake's beehive burners. There are a few others where garbage is a serious problem. Those are the two principle problems which could attract this kind of financial support. They are limited in number, but others do exist. We are going to see more developments in the future which explicitly recognize benefits to the local environment and which effectively will be paid for by the community at large, by the taxpayers of B.C.

Larry Bell has referred to the power pool idea that works in the direction of private-sector marketing. I've mentioned the fact that the power that moves through Hydro's grid can hardly be said to be in the private market, although if Hydro is selling it outside the province, it'll certainly charge what the market will bear. The private-sector companies will only go into business if they can make money. It's a stretch of the imagination, nevertheless, to say that the price of electricity is governed by the market place. It's an industry like natural gas, where there's a natural monopoly or monopolies. Costs determine price and because costs are well below what would otherwise be the market price, there's a bonus to society. You can argue that the bonus should be recognized, achieved, distributed, and so on; but, it does create a problem to those who want to conserve energy. It's a real challenge. We've got a good supply available at a very low price; in fact, near-to-free. Because it is admittedly used wastefully and will continue to be used wastefully, we do have a problem, particularly on the environmental front.

I am essentially a free-enterprise economist and a free-trader. I'd like the market to work more in the power industry. We are trying to involve the private sector. We've had some interesting results in that we now see new generation coming on that is cheaper than Hydro's new generation. Hydro is able to contract for some part of this cheaper power and keep its costs down. We do have this problem of managing the environmental side. With almost any development there is an environmental impact. The balance of the impact can certainly be good, as in the case of the Williams Lake development; but, most of the developments, I think, could be said to be impinging in some measure on the environment in an unfortunate way.

The title of my remarks was "New Directions in Electricity Policy in British Columbia". I think from what I've said, you've received an indication of some new directions. Certainly the private sector is involved now in a manner that it was not involved during the sixties and seventies in this province. Hydro's role is more definitive and industry, through cogeneration and other opportunities, will be developing more of its own energy for internal use than in the past.

I could ramble on. I think that if I tried to answer a question or two, this might fill in the rest of the time. I appreciate the opportunity to come up here to speak and I want to thank Larry Bell and his people at Hydro for putting on yet another very successful conference. Not only are consultants learning more about new opportunities for business with Hydro and the other companies, but I think we are all learning a good deal about a very interesting area of development which takes a lot of understanding, is very complex, and for which policies need to evolve. Thank you very much.

Thanks from Chris Boatman

On behalf of B.C. Hydro, the sponsors and the attendees of the conference, I'd like to take this opportunity to thank the Minister for taking time out of his very busy schedule to come here and address us. I am told that the plane is waiting for him; but, he has agreed to stay a little longer for questions. I am told there are only a couple of minutes before the Minister must leave. So maybe one or two is about all we can handle.

QUESTION FOR THE HONOURABLE JACK DAVIS ANSWERED AFTER THE FORUM

Question

Mr. Minister, you very correctly described a favourable financial position for B.C. Hydro and its ability to merge the services at the present time. I am intrigued by the question that if there were certain initiatives agreed upon, such as a major cleanup of a reservoir or undergrounding of electrical distribution lines, that could be funded by part of that surplus? How would the decision be made by Hydro whether or not to use surplus revenue for that purpose or to pay the dividend. Would that decision be made by the regulator, by B.C. Hydro in isolation, or by the government?

The Honourable Jack Davis

Well, I think that in practical terms, at least in the past and as far as I am concerned in the near future, it's a Hydro management decision. If it involved a substantial investment, the Utilities Commission might take a look at it, depending on the scale. It wouldn't be a government decision, it would be Hydro's. If it's cleaning up the environment or improving the landscape, and so on, I don't think that anyone is going to quarrel much with Hydro's judgment. Now underground wiring, especially high voltage transmission lines, is very expensive. However, I don't really see how that can be avoided, particularly in parts of the Lower Mainland in the next decade or two. I just can't imagine Hydro being allowed to drive those massive new rights-of-way through much of the Lower Mainland today, let alone in the not too distant future. It either has to go underground or perhaps power can be purchased near the load centre from someone who is prepared to generate using gas. This would be a means of essentially avoiding these great strips of unproductive land which are occupied by conventional overhead power transmission lines. If the alternative is, and it is accepted, to go with underground installation, so be it. It will be part of Hydro's costs. They'll be passed on to the consumers through Hydro's rates as they rise and as the rate increases are approved by the Utilities Commission. I think the public will largely determine the shape of those kinds of developments. Certainly, it would be unwise of any government to get in the way of either undergrounding wires or otherwise looking after land use in the Lower Mainland in a circumspect way.

Chris Boatman

I'm sorry. I'd like to keep you longer Mr. Minister; but, I've been told that we have to get you out of here for your next appointment. So on behalf of everybody I'd like to say thank you very much for coming here today to address our Third Annual Electric Energy Forum here in Prince George.

THIRD ANNUAL

ELECTRIC ENERGY

FORUM

Lifestyles, the Environment and Electricity Use

REVIEW AND DISCUSSION OF ISSUES

Session V: Review and Discussion Of Issues

Introduction of Rob Kikkert, B.C. Hydro
"Energy Audits"

Chris Boatman
Conference Chairman

Introduction of Rob Kikkert by Chris Boatman

Good afternoon ladies and gentlemen. I'd like to call the final afternoon session to order please.

The first speaker on the program this afternoon is Rob Kikkert. Rob is B.C. Hydro's Northern Marketing Manager and Rob comes to us with 20 years of customer service experience. The last six of those, he has helped to develop and implement B.C. Hydro's Energy Management Conservation Program and, more recently, the Power Smart programs for the north. His topic today is "Energy Audits" and the role they play in an Energy Management Program. Please join me in welcoming Rob Kikkert.

Energy Audits

Robert Kikkert
Marketing Manager
B.C. Hydro

Thank you ladies and gentlemen.

Dr. Henderson, in her opening remarks, mentioned we should all learn how to shape up our energy conservation in our business organizations. I'd like to help you by showing you how that can be done. To do this, I will review the basic elements essential to any energy management program, explain what an energy audit can do for you, and share with you some results of energy audits that we've completed here in the North. I have high hopes that I'll be able to convince you to implement an energy management program in your business organization and to take advantage of our Power Smart programs. (See Exhibit 9-1.)

Energy audits are tools used by energy management programs for business organizations and residential homeowners in order to save energy and reduce their bills. Regardless of the size and type of a business organization, there are four basic elements for a successful energy management program. (See Exhibit 9-2.) First of all, and I can't stress it enough, top management commitment to an energy management program is essential. You also have to have a person with clearly defined program responsibilities. You have to put somebody in charge of that energy management program. Then, you also have to define realistic goals for that particular program. You do your planning and then proceed to implementation. The Energy Audit is the first step in your planning process. Also, you have to make sure that you have a good monitoring system to be able to show you what results and what adjustments you are going to have to make to your energy management program. The Energy Audit, as I mentioned, is your first step in an energy management program. This step is made up of a number of surveys which will tell you how energy is being used and wasted. There are basically two types of Energy Audits. (See Exhibit 9-3.) A very detailed Energy Audit, which will fully analyze energy use and detail all losses, will also give you comprehensive payback detail. A walk-through audit is better for those buildings that are used for a short-term i.e., leased buildings. If you are a tenant in a building you might just want to do a quick walk-through audit. We've used them quite a bit to spark interest in energy management programs or energy efficient policies. Another important point is that, normally, five to 20 percent of the items identified in an Energy Audit will be no-cost or low-cost to change or fix. That is, these items have a less than two years or two-year payback. An Energy Audit will also establish a base from which results can be measured.

I would now like to go over some of the Energy Audits that we have completed here in the Northern Region. (See Exhibit 9-4.) We have completed 36 audits for the municipalities and regional districts in our region. What we offered them was to complete an energy walk-through audit in their municipality or regional district. Our main aim was to obtain their commitment to an energy efficiency policy or an energy management program. To-date, six of them have already adopted an energy management program and our work over the next number of years will be to follow-up on these audits and convince them to put an energy management program in place. (See Exhibit 9-5.) What we've found, when we did these audits, was that potential electrical savings ranging from five to 60 percent, depending on the total energy consumption of a building. That was a lot more than what we expected to find. This certainly gives us, and the municipalities lots of room for improvement in energy efficiency for their buildings. We found the average potential savings was about 25 percent. The major savings were in the lighting and ventilating area. Our Power Smart energy-efficient lighting program and a high efficiency motor program can help these municipalities and regional districts reduce the capital cost of any changes they make. We also completed three walk-through audits through commercial buildings here in Prince George. (See Exhibit 9-6.) Once again our main aim was to gain their commitment to an energy efficiency management program. We found in these three buildings the savings ranged from 14 to 27 percent. Once again, lighting was a main area of savings. We recommended that they do these three things. They could delamp, reduce the number of hours of use of their lighting systems, and convert to more energy-efficient lighting systems and products. The big advantage, we have now, is there are many products that are well-proven as far as lighting products are concerned. Once again, an energy-efficient lighting program is available to reduce the payback to less than two or three years.

In one of the offices that we went through, (see Exhibit 9-6) we noticed that people were having a lot of trouble with glare on computer terminals. The amount of ambient light they had in this particular office was just too much. By delamping a lot of the fixtures, changing them possibly from four-tube fixtures to two-tube fixtures, they could lower the lighting levels, and make it more comfortable for the computer terminal users, and also save energy. We also recommended that reflectors be put into those fluorescent light fixtures.

We also did an energy audit on the Coast Inn of the North. (See Exhibit 9-7.) Once again it was to obtain their commitment to an energy management program. In this building, we found that there was potentially an electrical savings of about 15 percent, with a total of about $18,600 annually that they could save by making some changes. The biggest saving alone was in changing their use of incandescent lighting. If you walk through this building you will see that they've got 60 watt bulbs everywhere. I am sure our auditors must have spent most of the day just counting light bulbs. We recommended that they can do to improve their energy efficiency is to change to more energy efficient lighting like compact fluorescent lamps for those incandescent lights. They have already started this conversion. One example of one of the improvements they've made is in this room where three exit lights have been changed to compact fluorescents. For example, they've changed two 20 watt bulbs to just one 7 watt compact fluorescent bulb. It's a good saving. They've also changed the lights just outside the hallway here. And they've also changed some of the pot lights outside of the coffee garden to compact fluorescent lights. And also in the ladies and mens washrooms they've put in new fixtures. And there's still a lot more they can do at this hotel. But I'll give them credit, they've started the process. And once again by changing to compact fluorescent fixtures we once again have a Power Smart program, the lighting program available for them to reduce their operating costs.

We also have done a detailed lighting audit in one of the larger retail stores here in Prince George. (See Exhibit 9-8.) We made certain Power Smart energy-efficient lighting program recommendations. We recommended that they make replacement of their luminaries to energy-efficient ones, install reflectors in their fluorescent fixtures, install electronic ballast in their fluorescent lighting, and also install light timers. We recommended adopting reduced wattage lamps. Sometimes that's a simple change of switching from the 40 watt fluorescent tubes to the 34 watt fluorescent tubes. And you can see the basic financial picture. They are looking at a capital cost of $224,000 for work that has to be done. B.C. Hydro, through its Power Smart program, will refund approximately $96,000. Their payback annually is about $44,000 and their payback would be three years if they followed all our recommendations. And the energy saved could serve 48 homes.

We haven't as yet done any audits on our industrial customers. We are planning to but we haven't completed any yet. But what we have done are some tests on specific industrial systems. One of them is to look at compressed-air systems. (See Exhibit 9-9.) We have a program that tests compressed air systems and by last month we have completed six systems. And the total loss of 660 hp gives you an indication of the leakage that these systems have. The idea behind the program is that after we have identified the leaks, the customer fixes the leaks, and we come back in six months and do a retest and see how well they have done. If they were to fix all the leaks that we've helped them identify, and all the others that they will find on their own, the energy saved could serve about 585 homes.

The next slide (not included in the Proceedings) shows one of our contractors with the compressed air testing equipment he uses for the test. What basically is done on this test, is that the contractor isolates the compressor, then checks the compressor's capacity. We make sure it's running up to its rated capacity. We've found in many cases that they are not running at rated value. There is often a problem with the controls. And just by making some simple corrections they can increase the efficiency of their compressor system. Then once we've checked the rated value of the compressor we test the whole system without using any air. And then we check to see how many losses there are.

We also did some audits on four residential homes in Prince George. (See Exhibit 9-11.) What we use basically is a system approach. We check for moisture, we check for moisture on the windows, chimney performance, ventilation and air quality, comfort and thermal efficiency, heating and cooling systems. (See Exhibit 9-12.) We rate these performance criteria from 0 which is unacceptable to 100 which is ideal. This gives you a kind of indication of the score card that we've used. Before I get to the results, in your registration package we have given all of you a home check-up audit, and we've designed it so you can do a check of your own home. All the instructions are there. So start your own energy management program right at home first. Good luck with your check of your home.

Here's what we found in just these four homes. One of the homes was an electrically heated home, and we found that the floor joists were rotting out, there was just too much moisture getting into the crawl space. So before they could do anything as far as energy efficiency is concerned they have to address some structural problems. But in this home what we would have basically recommended was most of their heat was being lost through the floor and we would have recommended that they first make sure the moisture is out of the crawl space and then insulate the crawl space the best way possible.

One of the other homes also had a moisture problem. It was a closet on an outside wall. So there is very little air movement getting into this particular closet and they were getting mildew or mould growing on the plaster on the inside of the closet. Also they had a humidifier in the house and I don't think they had it set quite correctly. It's a common mistake, people set it to the same setting as the thermostat for their furnace and that's not quite the right way to do it.

As far as the other two homes, we found them to be in good shape and we really weren't able to make any recommendations for improving them.

Just to make sure everyone knows that B.C. Hydro is taking energy management seriously, we now have an in-house program. (See Exhibit 9-13.) And what we are doing is trying to make all existing B.C. Hydro buildings as energy-efficient as possible and to demonstrate to our customers that we are committed to our energy management program. We have already started the process for many of our buildings. We've made sure that we've gone to the reduced 34-watt fluorescent tubes in all our building in the north, and we are going one step further to do detail audits of all permanent buildings that we own.

We've also put a coordinator in each one of the buildings designating one person as responsible for the energy management program and it would be his responsibility to make sure it all goes over and that everybody's aware of what's going on. (See Exhibit 9-14.) The idea is to complete a detailed or walk-through (depending on the status of the building) energy audit for the database, identify areas of potential saving and estimate payback. Our payback criteria by the way, is five years to complete the retrofit work, hire the contractors to get the work done, and monitor. Then we are going to advertise and tell the world what we've done.

Some of the benefits of an energy management program and completing your own energy audit and acting on your findings is to lower your operating costs, and reduce the investment required to meet future increases in load. (See Exhibit 9-15.) If you can make your existing system more energy efficient you are going to reduce the load on that particular electrical system, and if you do have to add some more load in future, then you've got some spare capacity. It enhances comfort, if you upgrade to these proven technologies and there are a lot of proven technologies out there that are just beginning to be used. Create energy use awareness among staff, which will make a positive impact on the public and contribute to the B.C. economy.

What's your next easy step? Well I'm not sure if it's an easy step. (See Exhibit 9-16.) But we are right back to where we started from. You need top management commitment to do it; you need clearly defined program responsibilities; a program coordinator; defined, realistic goals; and then planning and implementation. The first part of the plan is to do that energy audit and set up a monitoring system. (See Exhibits 9-17 and 9-18.)

Should you decide to conduct your own energy management program, we are available to help and show you how. Our marketing team and personnel would be happy to explain our Power Smart programs and how they can fit into that energy management program. Thanks very much.

Thanks from Chris Boatman

Rob, I don't think we have any questions from the audience for you to answer, so on behalf of the group I'd like to say thank you very much for coming up here today and running through the steps of an Energy Audit for us. Thank you very much.

Exhibit 9-1

Energy Audits are a tool used by *Energy Management Programs* for business organizations and residential home owners to save electrical energy and reduce bills.

BChydro

Exhibit 9-1

Exhibit 9-2

Energy Management Program

- Top management commitment
- Clearly designated program responsibility (Program coordinator)
- Defined, realistic goals
- Planning and implementation
  - Energy audit
  - Monitoring system

Exhibit 9-2

Exhibit 9-3

Energy Audit

- Audit types:
  - Detailed audits will fully analyze energy use and detail all losses. Payback analysis for each option
  - Walk-through audits for short term buildings
- 5 to 20% items identified will be no cost - low cost saving (payback less than two years)
- It will establish a base from which results can be measured

Exhibit 9-3

Exhibit 9-4

Exhibit 9-4

Completed Walk Through Energy Audits in Northern Region

Exhibit 9-5

36 Municipal or Regional District Buildings

- Obtain commitment to “Energy Efficient Policy”
- Potential electrical savings ranged from *5%* to *60%* of total annual consumption
- Major saving in lighting and ventilating/ pumping (motors) equipment
- Our Power Smart “Energy Efficient Lighting” and “High Efficiency Motor” programs could help reduce capital costs

Exhibit 9-5

Exhibit 9-6

3 Prince George Commercial Buildings

- Obtain customers' commitment to "Energy Management Program"
- Potential electrical savings ranged from 14% to 27% of total annual consumption
- Major lighting savings:
  - Delamping
  - Reducing hours of use
  - Conversion to more energy efficient lighting systems and products
- "Energy Efficient Lighting" program available to reduce payback from 2 to 3 years

Exhibit 9-6

Exhibit 9-7

Coast Inn of the North

- Obtain commitment to “Energy Management” program
- 15% potential electrical savings which total $18,600 annually
- Great savings (10.5%) through conversion of existing Incandescents to Compact Fluorescent Luminaries
- Power Smart programs available to reduce capital cost

Exhibit 9-7

Exhibit 9-8

Detailed Lighting Audit

- Large retail store in Prince George
- Power Smart "Energy Efficient Lighting" program recommendations:
  - Replacement of luminaries
  - Installation of reflectors
  - Electronic ballasts
  - Reduced wattage lamps
  - Timers
- Results:

Total capital costs:	$ 224,000
Power Smart rebate:	$ 95,700
Annual savings ($):	$ 43,700
Simple payback	3 years

- Electrical Energy saved could serve 48 homes

Exhibit 9-3

Exhibit 9-9

Detailed Lighting Audit

- Sears Canada - Pine Centre Mall
- Power Smart "Energy Efficient Lighting" program recommendations:
  - Replacement of luminaries
  - Installation of reflectors
  - Electronic ballasts
  - Reduced wattage lamps
  - Timers
- Results:

Total capital costs:	$ 224,000
Power Smart rebate:	$ 95,700
Annual savings ($):	$ 43,700
Simple payback	3 years

- Electrical Energy saved could serve 48 homes

Exhibit 9-9

Exhibit 9-10

Industrial
Compressed Air Program

- Compressed air system leak tests completed in 1990:

1 pulpmill	-	200 H.P.
2 sawmill	-	150 H.P.
3 sawmill	-	70 H.P.
4 sawmill	-	75 H.P.
5 sawmill	-	50 H.P.
6 sawmill	-	115 H.P.
Total		660 H.P.

- Plants repair leaks in Compressed Air system
- We retest in six months
- Electrical energy "saved" could serve 585 homes

Exhibit 9-10

Exhibit 9-11

Residential Energy Audits

- Completed audits on four Prince George homes
- System approach used:
  - Moisture control
  - Chimney performance
  - Ventilation and air quality
  - Comfort and thermal efficiency
  - Heating and cooling system
- Home is scored from 0 (awful) to 100 (ideal) for each of the above performance criteria

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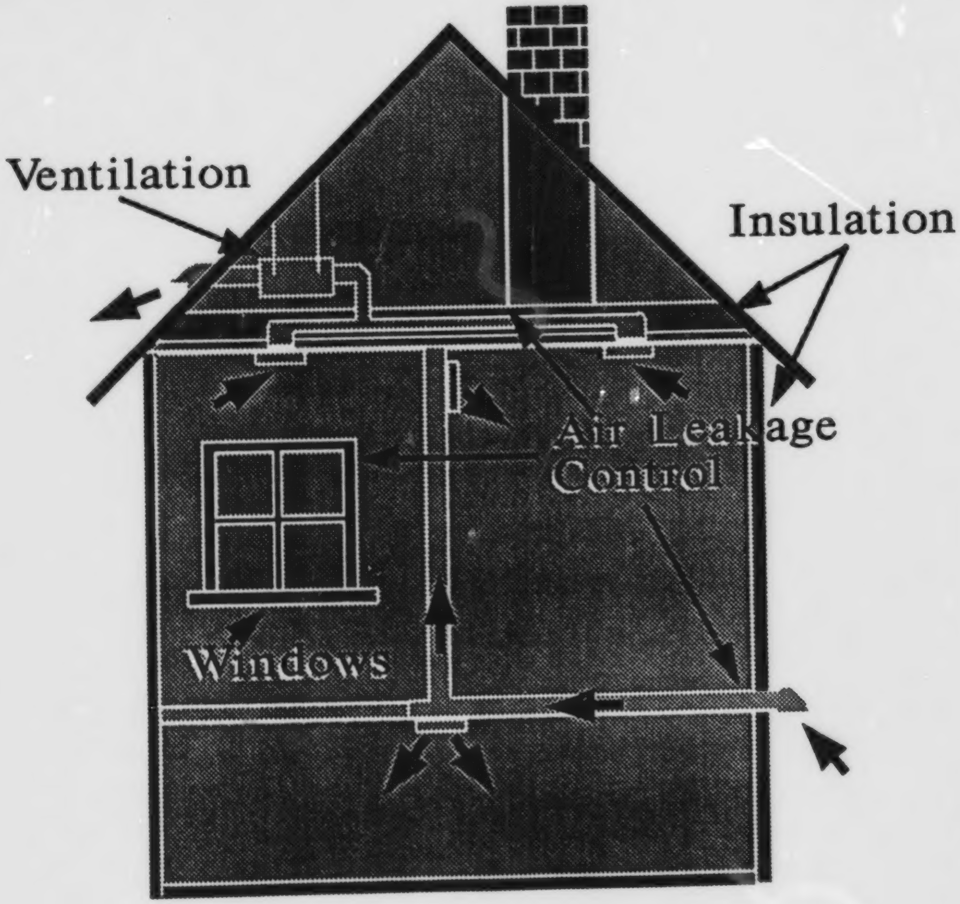
Exhibit 9-11

Exhibit 9-12

Residential Retrofit


Ventilation
Insulation
Air Leakage
Control
Windows

BChydro

Exhibit 9-12

Exhibit 9-13

BC Hydro In-House Energy Management Program

Goals:

- Make all existing BC Hydro buildings as energy efficient as practically possible
- Demonstrate to our customers that we are committed to "Energy Management"

Exhibit 9-13

Exhibit 9-14

BC Hydro In-House Energy Management Program

Action Plan:

- Complete detailed or walk-through energy audits for data base
- Identify areas of potential savings and paybacks
- Complete retrofit work
- Monitor and advertise results

Exhibit 9-14

Exhibit 9-15

Energy Management Program Benefits:

- Lower operating costs
- Reduce investment required to meet future increased loads
- Enhance comfort
- Upgrade to proven new technologies
- Create energy use awareness among staff
- Positive impact on public
- Contribution to B.C. economy

BChydro

Exhibit 9-15

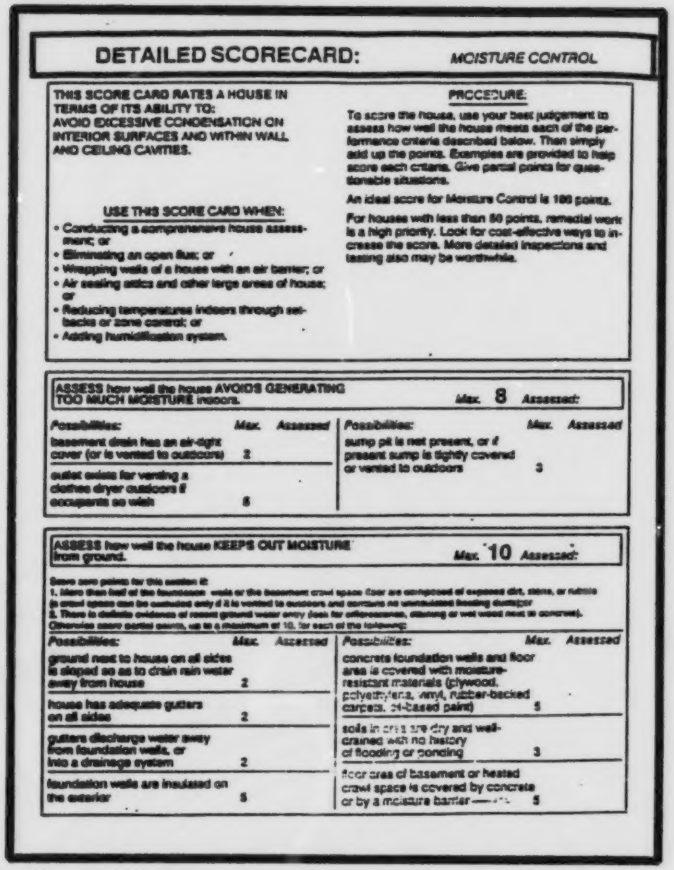
Exhibit 9-16

Next Easy Steps

- Top management commitment
- Clearly designated program responsibility (program coordinator)
- Defined, realistic goals
- Planning and implementation
  - Energy audit
  - Monitoring system

Exhibit 9-16

Detailed Scorecard: Moisture Control



DETAILED SCORECARD: *MOISTURE CONTROL*

THIS SCORE CARD RATES A HOUSE IN TERMS OF ITS ABILITY TO:
AVOID EXCESSIVE CONDENSATION ON INTERIOR SURFACES AND WITHIN WALL AND CEILING CAVITIES.

USE THIS SCORE CARD WHEN:

- Conducting a comprehensive house assessment; or
- Eliminating an open flue; or
- Wrapping walls of a house with an air barrier; or
- Air sealing attics and other large areas of house; or
- Reducing temperatures indoors through setbacks or zone control; or
- Adding humidification system.

PROCEDURE:

To score the house, use your best judgement to assess how well the house meets each of the performance criteria described below. Then simply add up the points. Examples are provided to help score each criteria. Give partial points for questionable situations.

An ideal score for Moisture Control is 100 points.

For houses with less than 50 points, remedial work is a high priority. Look for cost-effective ways to increase the score. More detailed inspections and testing also may be worthwhile.

ASSESS how well the house AVOIDS GENERATING TOO MUCH MOISTURE indoors. *Max.* 8 *Assessed:*

Possibilities:	*Max.*	*Assessed*
basement drain has an air-tight cover (or is vented to outdoors)	2	
outlet exists for venting a clothes dryer outdoors if occupants so wish	6	

Possibilities:	*Max.*	*Assessed*
sump pit is not present, or if present sump is tightly covered or vented to outdoors	3	

ASSESS how well the house KEEPS OUT MOISTURE from ground. *Max.* 10 *Assessed:*

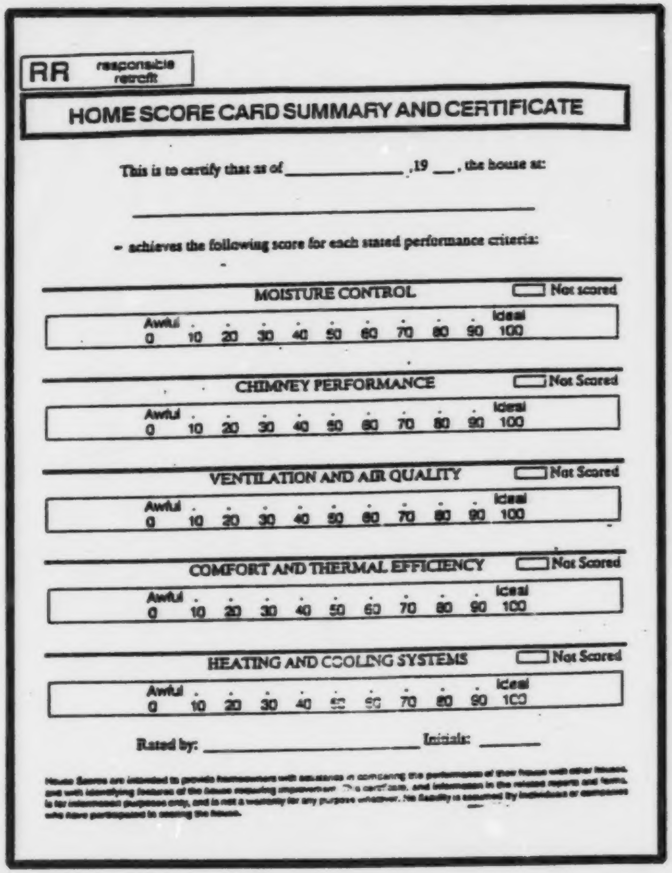
Save zero points for this section if:
1. More than half of the foundation walls or the basement crawl space floor are composed of exposed dirt, stone, or rubble (a crawl space can be excluded only if it is vented to outdoors and contains no uninsulated heating ducts); or
2. There is definite evidence of recent ground water entry (look for efflorescence, staining or wet wood next to concrete).
Otherwise score partial points, up to a maximum of 10, for each of the following:

Possibilities:	*Max.*	*Assessed*
ground next to house on all sides is sloped so as to drain rain water away from house	2	
house has adequate gutters on all sides	2	
gutters discharge water away from foundation walls, or into a drainage system	2	
foundation walls are insulated on the exterior	5	

Possibilities:	*Max.*	*Assessed*
concrete foundation walls and floor area is covered with moisture-resistant materials (plywood, polyethylene, vinyl, rubber-backed carpets, oil-based paint)	5	
soils in area are dry and well-drained with no history of flooding or ponding	3	
floor area of basement or heated crawl space is covered by concrete or by a moisture barrier —	5	

Exhibit 9-18

Home Scorecard Summary and Certificate



RR responsible retrofit

HOME SCORE CARD SUMMARY AND CERTIFICATE

This is to certify that as of ____________, 19 ___, the house at:

____

– achieves the following score for each stated performance criteria:

MOISTURE CONTROL ☐ Not scored

Awful 0 · 10 · 20 · 30 · 40 · 50 · 60 · 70 · 80 · 90 · 100 Ideal

CHIMNEY PERFORMANCE ☐ Not Scored

Awful 0 · 10 · 20 · 30 · 40 · 50 · 60 · 70 · 80 · 90 · 100 Ideal

VENTILATION AND AIR QUALITY ☐ Not Scored

Awful 0 · 10 · 20 · 30 · 40 · 50 · 60 · 70 · 80 · 90 · 100 Ideal

COMFORT AND THERMAL EFFICIENCY ☐ Not Scored

Awful 0 · 10 · 20 · 30 · 40 · 50 · 60 · 70 · 80 · 90 · 100 Ideal

HEATING AND COOLING SYSTEMS ☐ Not Scored

Awful 0 · 10 · 20 · 30 · 40 · 50 · 60 · 70 · 80 · 90 · 100 Ideal

Rated by: ______________________ Initials: ______

Panel Discussion:

Future Lifestyles, the Environment and Electricity Use

Gary Bannerman and Panelists

Introduction of Guest Moderator, Mr. Gary Bannerman, by Chris Boatman

Before we get to our closing speaker, we have one more lively panel to help us put this Forum into perspective during the next hour or so. We thought a discussion on the theme of "Future Lifestyles, the Environment and Electricity Use" would be of interest. We've invited a special gentleman to come up and lead this panel and he'll make sure we have an entertaining hour or so.

So I would like introduce to you Mr. Gary Bannerman, who is a Broadcaster and President of Bannerline Enterprises Limited. He is one of British Columbia's best-known talk show hosts. He has interviewed many internationally famous and controversial people. As an investigative reporter, he has exposed a number of criminal acts which assisted police in obtaining convictions. Mr. Bannerman has contributed many articles to newspapers, magazines and business publications. He has received many awards including "TV Week Reviewer's Choice" award as best radio/talk show host and the annual "Community Service" award from the B.C. Association of Broadcasters. Mr. Bannerman's passions are ships and travel and he is the author of several books on these subjects. Would you please welcome Mr. Gary Bannerman.

Guest Moderator

Gary Bannerman
President
Bannerline Enterprises Limited

Good afternoon to all of you. Thank you Chris. Chris Boatman is pursuing a media career himself. Not too long ago I saw him with Barbara Frum on the CBC "Journal". What was actually very interesting about that interview is that the subject was transmission lines. Very apropos to the conversations we've been having here. Their interview was about some of the detrimental affects of transmission lines and some of the controversy surrounding them. Chris handled himself in a very sensitive and compassionate way, talking about some progress that had been made in the field, and he was generally well-received.

When I introduce my panelists, they will in fact inform you with some expertise from the perspective of the agencies that they represent. Now I was reminded by Conrad Guelke to look at the program and notice that the Chairman will be following this panel; therefore, we can't upstage him. He's got to have the final word.

When we think of the theme "Lifestyles, The Environment and Electricity Use", I recognize that there has been a remarkable change over the past 20 years. Possibly the most famous quote about hydro generation in the history books, in British Columbia, was made by the inimitable Reverend P.A. Gaglardi, during a moment of abject frustration when he was serving in the Government of the 1960s, when great projects were planned. Gaglardi said, "If we listened to these people, we'd all still be walking around with candles in our hats." He talked about industrial development and the need for it. That was much the attitude of the day. The people who have served as Chairmen of B.C. Hydro, by virtue of the enormity of the undertaking, have occupied a substantial place in history of our Province and because many of them, most of them in fact, have been remarkable individuals. They have, through this corporation, played a big role in our society as it's unfolded. If the assignment is energy management, environmentally sensitive issues, the leadership couldn't come from a more important organization within British Columbia.

I've had the privilege of knowing most of the chairmen of B.C. Hydro in its public era: Hugh Keenleyside, Gordon Shrum, Chester Johnson, and, of course, Larry Bell. You'll hear Mr. Bell later this afternoon summarize what we've all been doing over the past couple of days.

Now, you have in your delegate packages little question sheets. As we proceed through this discussion and you have a question that comes to mind, jot it down, and I am sure it will be brought up to me. As time permits, we will put it either to the specifically designated panelists, as you see it, or we could put it to the panel in general.

Now, I am not going to go into long introductions. Some of the panelists are identified in your delegates package at some length, some are not; but I am going to do a general name identification and the position that they occupy. Each one of them will give a short opening remark. There's no time clock here, but they should be relatively brief, to the point, crystallize their position on these issues, and perhaps identify a little bit about the nature of their responsibilities, their assignment, and how they see themselves within the sphere of the subject matter.

There is only one of the panelists who is identified in the program in larger type than the rest of us. Unfortunately his name wasn't shown. It just says "Industry Representative". I will go straight to Laurie Gray, who perhaps wasn't expected to be first; but, I took the liberty of deciding what order we would hear the panel open up. Then we'll just let all break loose as we go on for the next hour or so. Laurie Gray is an environmental engineer based in Vancouver with one the Province's leading forest companies, Canadian Forest Products, better known as CanFor.

Panelist Laurie Gray of CanFor Forest Products

Thank you. It's a dubious honour to be first.

As Gary said, I work for CanFor Forest Products. I work in Vancouver as an Energy Environmental Engineer. CanFor owns and operates two pulp and paper mills in Prince George as well as ten sawmills throughout the province. CanFor is also a partner in Howe Sound Pulp and Paper in Port Mellon and a partner in B.C. Chemicals in Prince George.

We believe one very important issue is the concept of trade-offs. This concept was referenced by many of the speakers and was particularly well addressed, I felt, by Tim McDaniels. We considered many different trade-offs in our modernization program at Howe Sound Pulp and Paper. For example, our decision to install cogeneration facilities, as part of modernization, considered both energy conservation and environmental impact. In addition to generating 85 MW, these facilities will reduce the amount of hog fuel burned in open pits and in teepee burners. It will also reduce the amount of hog fuel placed in landfill and the associated leachates. We are very pleased that B.C. Hydro will be assisting in improving the overall economics of this project and that this will allow a temporary deferral of the construction of additional hydroelectric facilities. At our Prince George mills, purchased energy costs represent eight percent of our total manufacturing costs. We believe this is sufficiently large that it provides a significant economic incentive to minimize our energy use. So we carefully monitor energy consumption at all of our facilities.

We agree with B.C. Hydro that there is a strong link between energy and the environment. In fact, in the past month we have created two new positions in our energy and environment department in Vancouver. These additional engineers will be conducting both environmental audits and energy audits throughout our operations.

We look forward to working with B.C. Hydro in the electrical side of these energy audits.

As a company, we are pleased that we are already doing many of the things the way they've been recommended at this Forum. We feel we are moving quickly and are responding to the issues. However, we are always looking for ways to improve and this conference has helped develop some very good ideas. Thank you.

Gary Bannerman

Now there are going to be a lot of environmental points of view; but, the invitation to Steve Head was for him to focus on the direct impact on natural topography. This certainly can be dramatic in the construction of a power dam. Steve is past President of the B.C. Wildlife Federation.

Panelist Steve Head of B.C. Wildlife Federation

I was asked here on a slightly different basis than a lot of you. I represent the oldest, largest and, we like to think, the most credible conservation organization in B.C. So I am here to represent the public point of view, of over 40,000 members. I would like to make one comment that wasn't in my opening statement; but, I think it's very important. I have not in the past ten years attended any conference, symposium, workshop or convention, that had a more positive or constructive attitude of all participants. I think that's really important. I was asked to pose certain questions from a public perspective. Questions that either were not fully dealt with in this Forum or were not asked at all.

We heard about lifestyle modification being a very strong point in conservation. We heard about voluntary conservation being the most acceptable. Many, many speakers have referred to this.

I have to go back one year to a presentation made by Dr. Val Geist along the same lines. Geist's whole talk came down to one thing. He predicted that man, because of his nature and because of the consumer trap we are in today, will not voluntarily reduce his consumption. He will only do it when we reach some sort of environment or military catastrophe. His predictions sounded extremely pessimistic to the 200 or 300 people in that room. A number of us have discussed it in the past year in light of other symposiums we have attended and we are starting to wonder if, although pessimistic, Geist was maybe very right.

A question, I think that has not been fully dealt with here that is constructive and is one that I think future Forums will have to consider, is the one big "that". That perception of the public is that B.C. Hydro and Power Authority is a huge corporation. It is insensitive, it is inhuman. You learn that, fellows. You learned it a long time ago. People think that Hydro only has to appropriate some land, raise some money, build a megaproject; and there we sit and we have no choice. I have found out very strongly this weekend that this is not the case any more. I think the question that has to be answered by Hydro and answered strongly to the public is "Why is B.C. Hydro now so concerned about conservation of energy?" I think that public has to know that and I think it has to be reinforced.

The second major deficiency I noted, and it's not terribly serious but I think it has to be addressed, is about a phrase in all Hydro's printed propaganda, advertising and information. I see it all over the place now. In documents from the forest service, the forest companies and government; and the word is "public input". I submit to you that "input" is like "advice". It is easily ignored. The word that has been used now, this weekend, by many speakers and many of them Hydro people is the word "involvement" of the public. I think that's more important. But in itself presents major problems. The public forum has four major concerns as we see it and we are deeply involved in the public forum. Right now we are dealing with so many public hearings on land use, forest developments and the like, it's unbelievable. From a public point of view and from a government or company point of view, the public forum is very time-consuming. You have to travel around. You have to hold meetings. You have to listen to all these different ideas. Richard Dalon talked on that yesterday as to how many different answers you can get to one question. But there are too many of them for the public to cope with. We are involved as a public group and

I, as a volunteer, attended 19 public information input sessions this month on energy, pollution, land development, forestry and others. As a volunteer, how can I get to 19 different locations in one month in this province? Who can spare the time?

The other problem, as the public sees it, is the company or the government has the information and has the experts. Can you imagine, I was at a meeting in Alexis Creek on an access plan. We walk into a little meeting in Alexis Creek. We've got a rancher, a highway worker, a logger and a tourist camp operator and we sit down across the table from two engineers, a marketing representative, two biologists and four foresters. It's intimidating for normal ordinary people to face all these experts and people are not sure how to get the information they want. This in itself creates a problem for you when you hold a public Forum. You don't get good input back from these people, you don't get proper feedback because they don't know, or can't interpret what you tell them or they feel intimidated.

The last point that's tough on public involvement planning sessions is cost. It's going to cost you money. You are going to have to have to schedule those hearings at a time when the public can come. Jamie's well aware that we've written a very strong letter to the Provincial Government complaining about why all the public hearings are held on Wednesday afternoons and Thursday mornings. The public can't come out during the day, they are working. So it's going to cost you money for staff to hold evening and weekend meetings. That's going to cost you time; but, I remind you of one thing, these are our resources too. Also these are our problems. We are the consumer. We have either placed the demand or allowed the market to grow. We are now concerned, so we do have some responsibility to help with it. Thank you.

Gary Bannerman

You've heard our next panelist before in this Forum, a visitor from south of the border, John Elizalde. He is Chief of the Residential Programs Branch with the Bonneville Power Administration in Portland, Oregon. We have tended to look at the Bonneville Power Administration as a really neat way to wheel our excess power to Los Angeles, among other things. However, it has a considerable inventory of power resources available including one of the largest hydroelectric developments in the world, the Grand Coulee Dam, and many others as well. We are delighted he is here to add his viewpoint to the discussions.

John Elizalde

Thank you Gary. I want to concern myself with two points. One is something that is probably a series of questions and then others about the topics of the day. When I was sitting at lunch, somebody mentioned that during the 1950s and maybe part of the 1960s, B.C. Hydro was the government of the Province and that there were other people involved in that, but for all intents and purposes B.C. Hydro was the government. That was said pretty much as a statement of fact. I wasn't here and I don't know, so I can just relay that to you. That's all it was.

I am not sure exactly how much of that has changed, that what we are now discussing appears to be what the public is asking this utility to do. What I've heard over the last few days is that B.C. Hydro is shaping the future of the Province's economy and maybe even the lifestyles of the people here. It seems to me that B.C. Hydro is leading a province-wide discussion on basic value systems within the province. I wonder if that's the role you've asked your electric utility to play. That's something that everybody in the province is going to have to participate in answering.

This is also the company that provides your electricity, and I always wonder about whether or not we want our electric utilities to play the same role B.C. Hydro appears to be playing here. Maybe given what Steve just said about the 19 Forums going on is that you've got 18 others running around you doing the same thing. You've noticed, I'm sure, these issues that we've been dealing with are non-trivial. The other thing I've noticed is that the utility is the monkey in the middle. On the one hand, all of these special interests, presumably there are special interests in industry, business, fish and wildlife, recreation, economic development, academia, and government itself, you know, the seat of power. All of those interests tend to look towards, at least in the area of electricity resource pricing, to B.C. Hydro as a significant entity. They want B.C. Hydro to make decisions in their favour. So you really do have the electric utility in the middle. These are just things that I've noted and maybe you will dismiss them and maybe you will decide that's right and that's exactly the way it should be.

Certainly, the last will not change; but let's get onto what's gone on today. Frankly, I think we are all coming down to economics in terms of what B.C. Hydro does. I think that if environment impacts can be given costs and benefits, actions that affect the environment can also be given real costs and real benefits. We've already talked about the fact that there is a credit that can be given for clean-up projects. Presumably there are costs that can be attributed to resource development activities that degrade or deplete the environment. If we are willing to allocate the long-term costs and benefits accurately, I think that our decision-making will become more clear. I think that if efficiency is valued with money then we'll see efficiency developed just as we see other consumer projects developed. Something that I want to say to the folks who are pushing B.C. Hydro, and I have to admit that there are probably some of them pretty close to me, that sometimes the carrot works better than the stick. There are people, men and women, who work awfully hard, who are incredibly committed to the Province, who react real well to honey and don't react real well to vinegar. There are human beings who liked to be stroked when they've done a good job. They like to be told that they've done well. I don't know if you realize this but the B.C. Hydro is an anomaly in the electric utility business. I say that because Bonneville Power Administration is also an anomaly in the electric utility business and frankly I suspect that our Administrator and the Chairman of B.C. Hydro spend more time together than they really let on because their thinking and actions are both very similar. They really are an anomaly and that needs to be recognized. It ain't normal. Gary mentioned the way Chris responded to a series of questions about transmission problems. You ought to appreciate that folks, because it doesn't necessarily have to be that way. I would like to make just one more point: lifestyle modifications and value changes really are a lot different than using electricity. When we start talking about lifestyles and we start talking about electricity use we really can differentiate our value systems. We ought to decide where it is we want to place our emphasis with the electric utility. So those are just a bunch of random thoughts Gary, maybe they'll come up again, maybe they won't. I got them off my chest, thanks.

Gary Bannerman

I learned after we listened to Jack Davis speak at lunch that our next panelist is here sort of under new colours. He's from the Ministry of the Environment; but, when his name came up, Jack Davis said, "Where is Jamie now anyway?" It turns out that Jamie used to be in the Cabinet Office and was the Secretary to some of the Cabinet Committees that Jack Davis served on in the Ministry of Energy, Mines and Petroleum Resources. He is now with the Ministry of the Environment, where he's the director of Sustainable Development and Corporate Policy; Jamie Alley.

Panelist, Jamie Alley

Thank you very much Gary. I'm actually told that I have the two current buzz phrases in my job title that nobody can readily define: "sustainable development" and "corporate policy". I actually had somebody from an environmental group the other day asking me if "corporate policy" meant that I was the guy that planned how large corporations could go out and pollute. I had to tell them that it wasn't so, and that I am responsible only for policy development in the Ministry.

One of the benefits of speaking at the end of the conference, of course, is that I can benefit from what everybody else has said. One of the drawbacks is that much of what I might have to say has already been said and particularly by my Deputy Minister, Richard Dalon, yesterday.

I had the privilege last year of serving as the Secretary to the B.C. Task Force on Environment and Economy that was chaired by Dr. David Strangway. As Richard Dalon mentioned, we had over 250 briefs from all over the Province submitted to us on how to better integrate environmental and economic policy objectives.

I'd like to show you my favourite brief, and perhaps Mr. Drinnan could put the overhead on. As you can see, it was a Gary Larson cartoon that was sent to us. Scrawled across the top in crayon is, "Submission to the B.C. Task Force and the Environment and Economy". What it showed was a dinosaur talking to a bunch of other dinosaurs. The caption says, "The picture's pretty bleak gentlemen, the world's climates are changing, the mammals are taking over, and we all have brains about the size of a walnut." That actually came from a gentlemen by the name of David Lewis, from Crescent Valley, B.C. I finally had the opportunity to meet Mr. Lewis in March at the Globe'90 conference in Vancouver.

What I hoped has taken place here, over the last couple of days during the Forum, hasn't just been a bunch of doomed animals talking to other doomed animals that are about to be hit by a comet. If one accepts the theory that it was a comet that drove the dinosaurs out of existence, then the question that I would ask is, "What's the difference between us and them besides the size of our brains? I would like to think that one of the differences is that we happen to have a choice. We have that choice to control what happens to us and the dinosaurs did not. I wonder if the comet that is coming at us, is the growing environmental problems that we are facing, and whether we will take the action necessary to avoid our own extinction.

I am often asked whether the renewed interest in the environment is a passing fad. My usual response is to simply note that the world's forests are shrinking, the deserts are getting bigger, water and air are getting more polluted, and I am told that the Himalayan Mountains are washing into the Bay of Bengal. I think that we need to put these environmental problems into some kind of perspective, however. Williams Ruckelhaus, who was the head of the EPA in the United States in the 1970s, and again for a period of time in the 1980s, wrote an interesting article just a couple of weeks ago. Ruckelhaus pointed out, that much progress has been made, and he said, that we have been particularly successful at cleaning up some of the more serious point sources of pollution that are facing us (or at least we have the technology to do so). I think we only have to contrast the situation on our continent with that in Eastern Europe right now. I read a rather horrifying article about Eastern Europe recently; but, Ruckelhaus made the point that now that we have cleaned up most of the point sources, the bigger challenge facing us is going to be those kinds of environmental impacts that are more pervasive in that they are a result of our own lifestyles.

I think that's where B.C. Hydro is particularly clever in picking the topic for this particular Forum, because if it is those lifestyles that are going to have to change to solve the next generation of environmental problems, then really what we are talking about is new approaches and new institutions to make those changes happen. That's the point that Ruckelhaus was making. Now much has been made of this value shift that is taking place and I have been very sceptical until quite recently. We had the ultimate evidence that we in B.C. have a value shift taking place when the Minister of Finance tabled his latest budget this year.

What's the nature of this value change that is happening? Yesterday, I walked across the road and got out the World Book Encyclopedia because I had a notion that the Polish astronomer, Copernicus, in 1543 according to the World Book, published his treatise on the revolutions of the celestial spheres. What he said was, and this started his revolution, is that the earth is no longer the centre of the cosmos, that we are one celestial body amongst many, and that we are subject to physical laws. Now perhaps we can paraphrase this new value shift into a "Second Copernican Revolution" that would go something like this; "we are beginning to see that man is no longer the centre of the physical world, we are one creature among many other creatures, and we ourselves are subject to biological laws." In other words, if our water or air gets too dirty or nasty we will die. My students at the University of Victoria like to talk about a shift to a biocentric view rather than an anthropocentric view. In others we are just seen as part of the cosmos rather than the centre of it. Now this value shift changes from person to person but, I think that it really is taking place. The challenge to us and the challenge to B.C. Hydro, is how do we go about translating this value change into changes of behaviour. When I have been thinking this through, the obvious answer to me is that we need to help translate this new value change by reminding people of the consequences of the actions that they take. What I am really saying is that education is the key and it was interesting that this came up again and again in terms of Nick Sonntag's slides.

How many people here really know what is the most energy-efficient way of heating up water? I am told that if you are heating up less than a cup, put it in the microwave and if it's more than a cup you are supposed to plug in the kettle.

I won't go on to talk about all the things that the Ministry of Environment is doing to help translate this value change into actions. Richard Dalon talked about some of them yesterday. One of the key ones that I will talk about briefly is that we hope to have, about this time next year, a state of the Environment report for B.C. It's only then, when we clearly have the information to know what's happening out there, that we know what it is that we have to do.

The final note that I'd like to make is that not only do people change; but, corporations change too. One of the first jobs that I had when I joined the former ELUC Secretariat was to go to some public meetings on Lasqueti Island for B.C. Hydro's Cheekye-Dunsmuir transmission line project. Some of those particular meetings were very hot and heavy with some very strong views being expressed. What is interesting is that many of those things that the people were telling B.C. Hydro 10 or 12 years ago that were seen as radical propaganda, are now the very things that I have just been hearing from a number of B.C. Hydro people over the last couple of days, particularly from Mr. Bell, the Chairman. So corporations change; corporate values change. The final question that I would pose is "Are some of those radical views today going to be conventional wisdom within a decade?" Thanks.

Gary Bannerman

The final of our five panelists you heard last night and those who attended a fascinating assignment of minimizing power in the face of a crisis, is Dr. Walter Hardwick. After last night's session I felt profoundly disturbed. I went to Walter and said "Does this mean we have to make less use of our blow dryers?"

We actually go back a long way together. Dr. Hardwick, in his many pursuits, in the public and his career, where he has been continually teaching urban geography at U.B.C. I want to tell you one story that has nothing to do with our topic at all; but, it has something to do with the charm of British Columbia.

I was covering Vancouver City Hall with a column when Walter Hardwick was an alderman. We got to know each other pretty well during those very formative years in the City of Vancouver. One day at lunch, Walter invited me to go across the street to the White Spot. In hearing range of us was a very elderly alderman, whom I shan't identify - he is deceased now. He had served the city well for many years, but was now somewhat absent-minded. He was a nice enough fellow and everyone liked him, so we invited him across to join us at the White Spot. As we were studying our menus, he looked at both of us and said, "Don't order the Soup du Jour, it changes every day." And that's the truth! Dr. Walter Hardwick...

Dr. Walter Hardwick

When Conrad Guelke asked me if I would take part in this panel, he knew that I was Chairing the "Choosing our Future" program for the Greater Vancouver Regional District. Since January, the GVRD has undergone a very comprehensive look at what the future might be for that region, looking down the road 20 years to either "two thousand and twenty" or "twenty-twenty", depending on what it's going to be called. (That happens to be a major debate that you might now be familiar with.) Vicky Gabereau has said that it will be "two thousand and twenty" because Stanley Kubrick has already named it. However, the newspaper editors say it will be "twenty-twenty" because they all have named it. I guess it is going to depend, Gary, on the particular media source.

I have five topics that I would like to just put on the table. They are reflections on what we are seeing in the regional district. They may be of some use to Hydro and its customers as they think about the future tasks that they face.

First, the issue of "lifestyle and the environment". We have surveyed about 1500 people in the Lower Mainland. Within the survey there is a distinction, within that broad umbrella of environment, of two classes of concerns. One has got to do with question of public health, such as what to do with toxic wastes. These issues may not be related to power lines but public health issues are clearly recognized by the public. They are of a higher order than environment concerns which are broadly related to retaining the natural environment, as it is manifest in wilderness, views, or agricultural land. There's a scaling there, that needs to be recognized. What is clear is, that the ones that I have put under broadly the public health umbrella, are really questions of survival and life sustenance. People are now saying that there are a number of environmental issues that affect them as individuals and about those issues they feel very strongly. Many of the other environmental issues are still considered to be "very important"; but, are not necessarily "critical".

Another finding of our survey, and I think that it's something that probably concerns the Management and Board of this corporation, is that there is a loss of confidence in politicians, in experts, and in institutions. On the other side of the coin, there is a corresponding increase in a sense that local people know what's good for them that the community is a proper base for planning and for discussion. This loss of confidence in government, experts, and corporations is something for us to be very concerned about. I do not think that "the other side of the coin" is necessarily as well informed, and rather they are going to cater to local community and interest groups rather than regional or global issues. There is a decision-system problem that needs to be addressed. I do know, from my days in public office, that a lot of people say, "Look, we want leadership because we want to leave direction to you people who are leading, because we have a lot of other things that we want to get on with." We are in this position because people feel that there is nobody leading any more. Where change is taking place in decision systems, such as in Hydro, it is largely ignored because of all the baggage of the past. That will take a little bit to deal with.

The third issue that has come through from our survey was mentioned earlier by Hazel Henderson. On 57 issues that were identified in the Vancouver Region survey, people were asked to rate them between "critical" and "unimportant". On 34 of the issues the women's views were more intense, that is higher-scoring, than the men's. This was significant at the five percent level and some of it at the 15 percent level. This confirms that there is a major gender distinction on matters of public interest. They're probably in some kind of "Yin-Yang" that have got to be brought together to really find out directions. When I look at this audience, which is common to many I have addressed, I see suits outnumber whatever other attire on a 10:1 basis. I can understand why women are frustrated with decision processes.

The fourth comment that I would make is one that Hydro is dealing with. We are now in the era of demand management. The GVRD looked at issues of housing, mobility, "liquid waste", and "solid waste". It is concluded that the GVRD cannot meet all of the demands and accommodate everybody's wishes. We are going to have to manage demand.

In conclusion, Hydro needs to join other agencies and other institutions that are interested in problem-solving within the communities and within the regions. It is clear to me, since I've been involved with the regional district public process, that Hydro and the GVRD are going down a parallel course. Somehow, somewhere we need to identify those hooks that will bring our processes together, so that we don't make such demands on the public that people become frustrated and worn out in trying to respond. It seems to me that many of the issues that are being raised are common to several agencies. We need to get into these feedback loops and get new information, so that will enable all agencies to give better leadership. Perhaps, down the line a few months or few years, many more people may say, "Glad you're giving leadership, we're glad that you are in charge. We'll forget participation for awhile and go ahead and live our own lives." Thanks.

Gary Bannerman

I am going to put a question to any one of the panelists or all, if you so desire; but, bear in mind that we have limited time. A recurring theme of this event there has been the word "choices". There are trade-offs. We can have power, we can economy, we can have this; but, we have to sacrifice certain environmental considerations, perhaps some natural topography. Everything has a cost, one way or another. If we want park land and preserve vast territories, that has a cost. What are the choices? I think everybody would accept choices, a well-informed public, and seminars like this; the more information the better. It becomes easier for all of us to find out where we fit. The question is precisely this. Is there any simple way of making these choices? Is it purely a question of a democratic donnybrook on the floor of the legislature? How does one make the choices? Once we have, if we do have an informed public, can we accept the premise that trade-offs have to take place? How do we decide what the consensus is? Anybody like to respond to that?

Jamie Alley

Perhaps I could, wading in where "angels fear to tread". I really don't think there is a simple way. The more that I watch decision-making processes within government work, and with the greater degree of involvement that is being demanded by the public, I think the choices are becoming increasingly difficult to make. It's more of a question of muddling through and building consensus, and ensuring that the decision-making processes have a consensus-building component built into them, so that when the ultimate decision is made, it sticks.

Dr. Walter Hardwick

Gary, could I make a comment? There are a number of issues that showed up on the slides today that speak to consensus. Where there is broad consensus, leaders have got to bite the bullet, show that they are prepared to act. There are many other areas, where polling shows deep divisions. Then you face a very different situation. You've got to go into a problem-solving strategy of one sort or another. The problem that I see right now is even where there is consensus, government, corporations and others seems to be immobilized. They are afraid to act in case somebody is going to throw something in their face. My view is that they should identify, as quickly as possible, those areas where there is a majority consensus and start to act. If they do that, I think we are going to give people some confidence that somebody's doing something, and limit the domains of confrontation.

John Elizalde

I think that we have to accept the reality that not choosing is a choice. Not choosing, not making decisions, is likely to be as costly as making a choice in face of opposition or without a consensus, etc. It seems to me that the cognizant official, be that an industry or be that of a community, mayor, or board, or B.C. Hydro - whoever it is - will face certain deadlines at which time they have to make their decision. The key is going to be the participatory process that has been designed and pursued in both informing and then seeking advice and guidance from the populace. I guess, just a comment on this issue, the last word I wrote down as Dr. Hardwick was talking was about leadership. I think leadership in the 1990s there will not be the situation where the public says, "Well now that I see who the leaders are, I'm confident I can go about my business and trust them to make decisions." I think the leadership is going to be leading people in participatory processes where consensus, or at least clear understanding of the differences of opinions, is arrived at and then the cognizant officials will be allowed to choose if the process if okay. If it's a good process, the decision-makers will be empowered.

Gary Bannerman

Steve Head, do you have a comment on this point?

Steve Head

Yes, I heard what Walter said about immobilization and then I heard what John says about leadership role. As an example, we have all just gone through the Carmanah uproar and that's what it was. Four years ago the plan that was accepted by Mr. Richmond was agreed upon by many of the groups involved. Nothing happened because the bureaucrats did not have the regulation, legislation or guidelines or whatever it was to do it. In the Stein Valley, the user groups agreed on the logging plan 14 years ago. I was on that original panel and so was Ruby Dunsten, who now opposes it. There was no action. Something happened to the process. That can't be allowed to happen. I think that John's remarks are relative as to what has to happen to the process.

Gary Bannerman

Laurie Gray you have a quick point here, I have another question for you as well from one of our members of the audience.

Laurie Gray

Yes I do have a quick point. I think values are changing. They have been changing significantly, particularly over the past few years and generally speaking, industry reflects the values of society. They try to reflect those values as best they can in the decisions that they make. The weighting of the factors that enter into decisions has also been changing a great deal over the past years; so, the decisions that are being made are significantly different now, as compared to 30 years ago. The input from society has been a very positive influence in making those decisions.

Gary Bannerman

Laurie, a member of the audience has asked a question about media advertising by the forest industry about reforestation. The question really is "Is it possible to reforest after clear-cut logging?", suggesting that the entire ecosystem is frequently removed along with the trees; so, can it really be reforested and therefore is the advertising not misleading?"

Laurie Gray

Well I am not an expert on forestry so I don't feel I can answer this question in full. I do know that there are a number of reasons why clear-cutting is the harvesting method of choice. Safety is one of the prime considerations, the safety of the loggers involved. The alternative of selective logging is quite dangerous for the people who work in the woods. There's a number of other factors, such as how easily insects are able to take hold of a forest that is not clear-cut. I think the key point is that clear-cutting is the method that nature uses through forest fires, and when we replant we choose the species that will regenerate best in a particular area. The areas that are replanted are carefully researched before that replanting takes place.

Gary Bannerman

It's an enormous cost, our hearing processes, which we, perhaps most of us, accept as necessary. Public hearings, rate applications, government commissions, not just public utilities; but, in the case of the telephone, private companies that have a monopoly also have to go before these commissions. Lawyers, accountants, brief presenters, engineers, consultant studies, all of these play a role in the cost. Now, intervenors also face costs. A question has come from the floor about the funding of intervenors. Now, should there be some system of funding? I could ask any of the panelists to respond to this. Should there be some funding so that intervenors could do as competent a research job, as well-financed a research job, as the utility itself? If so, who should pay? Government or in the case of Hydro, B.C. Hydro? Any comment?

John Elizalde

I am going to get in and out of this real quickly as a utility guy. In the States, the investor-owned utilities are regulated by state commissions, similar to your Utility Commission. So, we have a variety of solutions to this funding. In the State of Oregon for example, we have a Citizens' Utility Board that was created by public referendum and is financed by the public. In other words, we choose to pay so much per year for membership. There is some subsidy coming from the utility but it isn't extensive. Keep in mind that we do pay the Public Utility Commission and its staff to do research and to monitor as well; but, that is obviously not the intervenor role. I believe in the State of Washington, there is a more direct payment for the intervenors that participate in that process. Certainly, and I think that Steve mentioned it when he talked, just participating in the process costs a lot of money. As a public person, I've always wondered just how important the intervention is, if the public's not willing to pay for it through the voluntary process. That's just a question that I ask, how valuable is it to the public if they don't want to pay $5 or $10 a year.

Steve Head

This may sound strange coming from somebody representing my organization; but, I don't think intervenors should be funded. Let me develop that. If we have a proper process in place of public involvement and consultation, these things won't happen in a hurry. We won't get to a point in three months when all of a sudden an application comes for a major project and then we are in court. It will happen over a long period of time. The review processes are being tightened up by government. Public involvement is public input and is being talked about more and more. I think that if we ever get to a point of granting intervenor's status, the groups who wish to be intervenors will have proven their credibility to represent a certain point of view and would be granted intervenor's status in court. They would also have had the time to get their funding together. I don't think that the public purse or the company purse should have to fund four people from Telkwa to be intervenors in the River's Defence Coalition court case when the public is already represented by three large public groups. I think that's the problem.

Gary Bannerman

Now there hasn't been much discussion, according to one question that comes to me from the floor, about exporting power to markets south of the border. The question is "Is British Columbia not wealthy enough at the moment, do we really have to do this given that we would have to sacrifice certain environmental values to increase our generating capacity?" Any comment from any of you on this?

John Elizalde

Just to answer it quickly. BPA sold energy all the time during the latter part of the 1980s. We had a 2000 MW surplus and we sold it to Southern California in a number of different arrangements, some a little bit more economic for us than others. From what I heard over the last few days, B.C. Hydro is not developing resources to sell south. I mean, they will do it to the extent that they will bring on resources that will cause them to have a surplus over a given period of time. There's an appetite in Southern California for electricity, that's for sure. We are participating, I don't know if Mr. Bell mentioned it or maybe Chris Boatman mentioned it; but, we are participating in a "Westcoast Vision" exercise. We, being Bonneville, B.C. Hydro, other utilities on the West Coast. We are working to have an optimized West Coast Power System. But right now, unless I'm mistaken, export development is not high on the agenda for B.C. Hydro.

Gary Bannerman

Actually, the policy in British Columbia, in recent years has been, from the politicians, anyway, mostly against export development. Most of the people who understood our future power needs have never understood why. It was thought it would be prudent, not for the purposes of profiting from it; but for the purposes of beating inflation by building resources before they were thought to be necessary, much as you said. In the long run, if we are going to need the resource anyway, why not build it now under a contract situation where we could have it financed by others?

A question for Steve Head. "Do you still believe or does the B.C. Wildlife Federation still believe, in terms of industrial power development, or whatever, that there should be a 'no net-loss' concept in any future development?"

Steve Head

Well that's a tough one to answer because they haven't really defined "no net-loss" of what. I'll take it in the broad context. Where policy still stands, that an industrial development happens in this province "no net-loss", of fish, water, land for forestry, was a concept that could be waved around like a banner 20 years ago. It's becoming very difficult now because one of our biggest developments is called population. It's pretty hard to allow Surrey to grow and say there shall be no net loss of anything, unless we just don't allow the people to live there and we tell them to go to Alberta or something. So we have to make a revision on that, Gary. "No net-loss" of fish was a common one when it dealt with hydroelectric projects, no net loss of wildlife habitat. Now how can I apply that to a Williston Reservoir because we covered thousands of hectares and we did lose some habitat. Attitudes have changed - from the corporations and from ourselves, and from the government. I think we are more consultative now. Our "no net-loss" policies and types of policies are under review.

Gary Bannerman

You made a comment in your preamble that until relatively recent times B.C. Hydro was viewed to be insensitive and inhuman in its development. On the other side of the coin, many people in business believe that environmentalists, not that they would necessarily ascribe that label to an established organization like the Wildlife Association, but that many environmentalists are basically a "rent-a-crowd" who will protest anything. You know if it's Monday, there's got to be a cause. Change the letters on the placard and let's march to save this valley and off they would go. There really is no level-headed, thoughtfulness behind protests. Just protest for a cause. Since you are the closest thing to one of these environmentalists we have here, a very unfair position to be in, but as they say in television, you're on that side of the issue. Steve?

Steve Head

Okay Gary, seeing as you are the closest thing we've got to a media personality! Personally I have a real problem with the term "environmentalist" and I don't think of any of our members as environmentalists or any of our policies as environmental. We view environmentalists and preservationists as a bunch of, as you said, Johnny-come latelies, born-again environmentalists. Gee, the Lower Mainland is full of them, they just got blue boxes, isn't that wonderful? Now they don't have to do anything else for the environment. They'll just keep throwing stuff in the blue box and they've done their part.

We consider ourselves to be conservationists, we always have been. We consider ourselves consumptive conservationists. We hunt. We cut Christmas trees. We cut firewood. We think there's a real difference. A consumptive conservationist is a true conservationist. We've been that way for 35 years. We just didn't erupt last Tuesday. I'll tell you another thing, Gary. I just checked out something. Registered in the City of Vancouver, not Burnaby, West Vancouver, North Vancouver or anything, there are 56 anti-trapping societies, 118 antihunting societies and 231 environmental societies, who have a total membership registered of under 7,000.

Gary Bannerman

Well that brings to me a thought that came to mind when we were discussing regulatory hearing and public hearings. In my experience, going to many of them, the one thing absent from all these hearings is the public. Many lawyers, many accountants, many intervenors, many commissioners and much money; but, very few citizens ever go and they are created for that purpose. Now, I don't know what we can replace them with. The opportunity is provided, but is there really sufficient public interest unless motivated by anger in any of the issues that you people have been so attentively studying for the last couple of days? Is there anything that really gets the public going to hearings, to getting involved in the political process, not necessarily in a partisan way, but in debating issues and showing up at public hearings in numbers? They don't show up, and millions and millions of dollars are spent on hearings that nobody goes to. Anyone of you might address that.

Dr. Walter Hardwick

You are correct, Gary, insofar as a set of forms and institutions meet certain regulatory requirements; but, what you are basically saying about the public, I think, is incorrect. The public interest in issues comes in pulses. It's not any kind of continuous flow. The problem with the regulatory process is that, every six months or six years, a hearing comes up as a matter of regulation, and many a time there really aren't any bothersome issues. Somehow, it seems to me, we've got to start to accommodate regulatory items and make them a little bit less costly and a little less formal. At the same time, we must be able to realize when these pulses of emotion or adrenalin comes through. then we need another kind of open process. We basically got formality without recognizing ebbs and flows of public interest.

Jamie Alley

Well I'd like to challenge this notion that people don't go to hearings. If we think back to the last project hearing in B.C., which was the Site C hearings in Fort St. John, Keith Henry was very clever in setting up the hearings into two formats: a formal hearing process and a series of community-based hearings. I find it very difficult to stand up in a room like this with a microphone in front of my face and I think the general public does too. While Joe Public may not have shown up at the formal part of the Site C hearings, the community-based hearings at Chetwynd, Dawson Creek, Ft. St. John, and Hudson's Hope were, to my understanding, well attended at the time. I think the point is finding the forum that's most appropriate to the situation. If the purpose is to build consensus for a good decision that everybody wants to live with, then I think public hearings are the wrong way to go. They've been described as "blood sport" and often times they can be that way. They don't make for good decisions, necessarily. Walter just pointed out that there are regulatory niceties that need to be gone through and I agree. Most of those are largely technical decisions; but, the broad social choices are not generally well served through the process of public hearings.

Gary Bannerman

It's my experience, from hosting radio programs for many years, that almost every commission or hearing process that goes on the road in the province, that sooner or later I would hear about it. The suggestion was made that maybe we should use the radio to promote the fact that the public can go to these hearings. So I did this, and invited the chairman, or the commissioner, or whatever, and they'd all tell me the same sad stories. That they went from this town to that town and nobody came out, despite the fact that they'd advertised them, and publicized the dates. In any event, I think that the public interest is there; but, if the hearings on any process have a useful purpose in the consensus process then we'd better find a much better way of doing it and promoting it, and making people feel more comfortable and more involved. Otherwise, I think a lot of money is wasted in the process.

Now a question that came up to me from the floor. I'll just read it as is. "Delegates to the Forum have rejected large hydro, coal, and nuclear as future power sources. Is this a reasonable economic position?"

John Elizalde

I can say that in the resource stack in the Pacific Northwest i.e., the order in which we buy resources, the first source we would use would be the lowest cost with the lowest environmental cost as well, all the way up to the most expensive. We would make any decision from an economic and environmental standpoint. Now, what's important is that based on our load growth we determine our need for power and the costs required to produce these new resources; but, for a significant period of time, at least through this decade and beyond, it's appropriate to keep the major station generation facilities waiting in the wings. I know that there's a difference of opinion regarding Peace Site C within the Province; but, that's just to tell you what's going on south of the border.

Gary Bannerman

Now a question that John Elizalde, raised as part of his preamble. I don't think it's been addressed by the others panelists, and I think it's a very good one. Talking about his own company, Bonneville Power Administration, and B.C. Hydro. The question is this: "Should the leadership on the socially sensitive causes be coming from the power utility or should the power utility merely do what it's there to do - provide power upon demand and charge the appropriate price for the service? Should the leadership come in that direction?" Would the other panelists like to address that?

Steve Head

Must be nice just to make the statement and let everybody else worry about it. I think, that at the present time, the leadership has to come from the utility or the government. The public does not have the where-with-all yet to provide full leadership to somebody like B.C. Hydro. Sure, they are a Crown Corporation and we all own them; but, you know, Larry Bell's got the job, not me. That's because he can do it and I can't. I think it has to be a shared leadership; but, a majority has to come, at this point from the top.

Dr. Walter Hardwick

Gary, I think that the point that I was making earlier is that I think Hydro should join with other organizations and institutions that are going through very similar kinds of processes. It is clear that Sandy Peel's adventure into the area forest policy is an attempt on the part of the Government, through its agencies, to try and find out, in a sense what the policy framework should be down the line. We recognize that in the regions that I am operating in, government agencies, such as B.C. Transit, are very clearly interested in the question of the change of behaviour of people and what's the consequence of that going to be. So it seems to me that there is a real role for major entities and major interest groups to go into this. I think the problem is when all of them are going through parallel processes and people like Steve, and what not, have to appear before all these. The whole thing becomes unfocused. I am not sure how we might be able to do things with better coordination. But I think that it would be something worth exploring.

John Elizalde

Excuse me, it's kind of like a vision issue, but I think it's a vision and who is it that has to help build the vision. That's really what I was trying to get at. Jamie maybe is going to tell us; but, there is a vision for the Province and then the individual agencies can determine through a public process how they meet that vision, what goals and objectives they have to have. But right now, it seems like maybe what the Professor is telling us is that we have a bunch of agencies trying to figure out what the vision is separately.

Dr. Walter Hardwick

I recognize that politicians have a hard time giving leadership, particularly when we are going through major parametric changes. Politicians, in the final analysis, are representatives of the citizens. Most politicians are not futurists. So they have to look to where they can get the information and guidance they need. Many of them will look into their ministries. When they look into their ministries they found regulators rather than people with vision, and how to do alternate sorts of things. So government, irrespective of the parties involved need to recognize that we are in a transformation period. They need, in part, to go to their ministries; to their agencies; and to the interest groups. When they eventually find some consensus that they can work with they will do what the citizen representative should do. That's make decisions. We live in a very untidy period.

Laurie Gray

I'd just like to say a few words in favour of the hearing process which is tied in with this question. When questions that are socially-sensitive come up, if they do not receive proper consideration through the hearing process, then that cuts off considerable input. The hearing process may not be the best way to get this input; but, it has a track record and it has worked reasonably well in the past. We, as an industry, have participated to a great extent in the hearing process and we continue to support this process.

Jamie Alley

I'd just like to go back to those hearings that I was talking about earlier on the Cheekye-Dunsmuir transmission interconnection to Vancouver Island and those hearings weren't hearings, they were actually public meetings. I remember one night on Lasqueti Island, where the local islanders really went after Hydro. They kept pushing them and pushing them and said, "How did you make this decision that Cheekye-Dunsmuir, was the only way of getting power over to Vancouver Island?" and at that time Hydro was saying, "Well look, we've done the technical studies, project justification is something that we do and we know the best thing to do and we are only here talking about the safest way to build it." So they didn't want to ask the "whether to" question. It was more the "how to" question. When they kept getting pushed and the islanders said, "Where do you get your direction from?" They said, "We get it from the Board." "Well where does the Board get it from?" "Well the Board gets it from the B.C. Government".... so "How does the Board get political direction because we want to talk to the politicians?" And they said, "The politicians sit on the Board, two of them." And I think it was a feeling at the time that those lines of political direction to Hydro were rather thin and by the time the Cheekye-Dunsmuir project was really over, there were a number of people in Hydro who were saying, "The next time through, let them figure out what project they want and then come to us and we'll just build it for them." I think that Laurie's point, in terms of hearings, is "right on". Since the Utilities Commission Act was passed in 1980, Hydro is now required, in all of their major projects, to go through, in a public way, the project justification. In other words, the thought process that led Hydro to come to the position that this is the best project is now subject to public scrutiny. I think that is a case where the public hearing process works very well.

Gary Bannerman

Now unfortunately I have many questions in front of me. We have very few minutes left and I want to let each one of the panelists have a final word before we adjourn this session and make way for the Chairman who will be following us immediately. Apologies to all of you, there are many questions here. Presumably, you will have an opportunity to put them directly to your associates and the panelists after we conclude; but maybe, the simplest way is to begin at my immediate left and we will roll across the panel. I don't know how you summarize two days of conversation such as you've just had; but, this being the final panel discussion, perhaps my guests will attempt to do it in about a minute or so and then we'll be right on time.

John Elizalde

One thing that I want to say, it's an impressive Forum. It's dealing with issues that are particularly important. I sense a beginning. I sense a coming out. I sense a new relationship, and a new way of doing business for B.C. Hydro and for the public, and especially in the northern part of the province. It's been mentioned a few times. Again I want to remind everyone that we all do better in a positive environment. Constructive criticism, thoughtful ideas of how to do something better will be a lot more instructive and productive. Hydro is certainly facilitating the idea of public involvement with the workshops that were held earlier today. This might be a way of facilitating the dialogue. It doesn't happen in hearings with that type of a setting. It happens with the roundtables spread out all over the room with people talking amongst themselves. That's how real dialogue occurs. I want to express my appreciation, the appreciation of our agency for being invited, and being asked to participate and being allowed to take away as much, as I have, and as we have. Thank you.

Steve Head

Sitting here I see two comments in my notes that were made by other speakers that I think are the summation of what we have all been talking about here and probably some of the solutions that have been suggested. Hazel Henderson said, "globalization of consumption." That's part of the problem that we are faced with. John said, "the growing catastrophe of development bred for man's greed and avarice." Hazel Henderson also said, "we must battle the advertising indoctrination machine and the history of that machine." But you know I think we are on a pretty good roll here. B.C. Hydro, in my opinion, has presented themselves as a leader within this province, and possibly outside of this province, in accepting a very concrete and positive attitude involving all of us in the solution to the energy problem. I think their example can be copied in any industry or any environmental situation. Mr. Bell, thank you.

Jamie Alley

Well, I think it comes down to this, the Ministry of Environment certainly doesn't have the answer. B.C. Hydro doesn't have the answer. Conservation groups, (I'll call you that, Steve, rather than an environmental group), you don't have answers either, in that really there aren't any simple answers and what there is, as Hazel Henderson said, is simply a range of choices. Then it becomes a question of consensus-building for those choices that we want to make and having the right processes to get there. The one point that I'd like to come back to is that we all, as individuals, need to take responsibility for the consequences of our own actions and that information is critical and key to helping people, who perhaps have gone through that value change, to take that value change and put it into some kind of action. Once again, I'd like to say thanks to B.C. Hydro for putting this session on and starting that process of really helping us to look at our own lifestyles and the consequences of those kinds of lifestyles and giving us the kinds of information that will help us take those concrete actions that change our behaviour.

Laurie Gray

It's getting more difficult to make additional summary comments as the number of speakers increases; but, I would also like to thank B.C. Hydro for putting this Forum on and for inviting and advertising the Forum to the wide variety of people who have turned up. There are a number of utilities here, a number of industries, a number of environmental groups, and other interests, and it's very important to be exposed to all of these different points of view so that they can be factored into decisions that we all make individually and on behalf of our organizations. So thank you B.C. Hydro.

Dr. Walter Hardwick

The majority of people in this province are prepared to act to conserve. But people need to be given concrete examples of what to do. B.C. Hydro, in this conference, and the example that they are putting forward by helping people, through audits and even through television shows is doing right things. These will make people see, in a concrete fashion, how they can act. In our polling, there were two groups that were divided on being prepared to act. One group are people who are over 70 years of age. It may be that they just don't have the where-with-all to act. The other group is the under 18. It may be that these are the ones being most affected by the consumer advertising society. It suggests a challenge to Hydro to look to the schools and through pop culture to deal with change in behaviour that those people who are in the 25 to 65 age group have already bought into. Thank you.

Gary Bannerman

Thank you to the panelists and for the attention of those of you in the audience. From a media perspective, I have a comment of my own to the general premise of why, as John asked, a Hydro utility takes the lead in these areas. Something you may think about as you leave here. Consider the alternative, if you don't take the lead, you spend your entire life on the defensive. It's simply called being proactive. Any modern corporation that doesn't vigorously address these issues in a sensitive and compassionate public way is doomed to spend a lot of time dealing with problems. Thank you all.

QUESTIONS FOR LAURIE GRAY AFTER THE FORUM

Question

Recent Media Advertisements by the forest industry about "reforestation" appears to be misleading. Is it really possible to "reforest" after clear-cut logging? As clear-cutting not only removes trees, but also destroys the natural ecosystem in the area. Replanting trees does not restore the forest ecosystem. Should not the advertisement read "retreeing"?

Laurie Gray

I have discussed this question with one of our foresters, who responded as follows: Clear-cutting does not destroy natural ecosystems, but rather it alters them. The International Union of Forest Research Organizations and the Food and Agricultural Organization of the United Nations define reforestation as "re-establishment of a tree crop on forest land". Based on this generally accepted definition, it is possible to reforest after clear-cut logging.

Forest ecosystems are not stable; they continue to change over time in a process called ecological succession. The effect of clear-cutting on a particular forest ecosystem is that the ecosystem is altered from a later successional stage (or climax forest) to an earlier successional stage. Conditions of microclimate and vegetation that existed in the climax forest are changed to those found at an earlier stage.

After a major disturbance, such as clear-cutting (or other natural disturbances such as wildfire or windthrow) the natural process of ecological succession will begin to change the site back to a climax forest ecosystem. The role of tree planting then is to hasten the process of ecological succession by re-establishing trees faster than would happen by natural means. Species selection prior to tree planting further hastens this process.

QUESTIONS FOR JAMIE ALLEY AFTER THE FORUM

Question

The issues for which choices must be made are often technically complex. My perception is that the public has great difficulty in knowing what the alternatives are and the consequences of each alternative. Do you agree that this is a problem, and if so, how should it be dealt with?

Jamie Alley

I agree that it is a problem that the choices to be made between alternative courses of action are often very technically complex, particularly for the public to deal with. This is why we have the detailed decision-making processes that we have. The public themselves can review to the extent possible, these choices at both technical levels and at the level of social desirability. However, there are also a large number of increasingly well-informed interest groups who have technical experts that act on behalf of the public in these decision-making processes. Finally, one would hope that government and its experts will act as an additional watchdog for the public interest.

Question

I understand we all must work to minimize the impact on the environment when electrical energy projects are undertaken. However, the extreme cost to the taxpayer of compensation paid for environmental impact must be considered. First, are they necessary? Second, if compensation is necessary, is it a reasonable amount? Remember the choice, which may be the view of a minority group feeling amplified with the help of the press, is paid for by all taxpayers.

Jamie Alley

I disagree that the cost of compensation awards have been extreme and I think that the literature on the subject would back me up. In British Columbia, we work under the "Environmental and Social Impact Compensation/Mitigation Guidelines" established by Cabinet in 1980. These Guidelines set out very clear economic principles that govern all mitigation and compensation activities, and in particular, that payments should not exceed the value of the resources lost.

As an example, the total of the compensation award for wildlife losses on the Seven Mile Dam project was $1.8 million which represents an extremely small fraction of the total capital costs of the project. The principle of "polluter pay" is going to have increasing application both in government policy and in the courts. If an activity destroys property or a resource, then the person that causes that damage will have to pay for it rather than passing the costs on to somebody else, particularly if that somebody else is future generations of British Columbians.

I also disagree that compensation awards are the result of "minority group feeling" or "with the help of the press". Mitigation programs and compensation awards are only established after very specific analyses have been undertaken as specified in the Guidelines. To blame the group that may have to suffer the damages for bringing these to light is illogical.

Chris Boatman

I think that was an excellent way to spend the afternoon. I think there were some very interesting comments.

I'd like now to invite our Chairman, Mr. Larry Bell to make some closing remarks to you. I don't need to introduce him to you. You've met him a couple of times already.

Closing Remarks

Larry Bell
Chairman
B.C. Hydro

Thank you Chris. Ladies and gentlemen. A lot of great questions from the panel discussion and I just wished I had been up here and have some time to respond to them; but, let me just make a few observations. Before I do, I thought I would just share something with you that I will be announcing tomorrow in Vancouver and that is the creation of an auction market for a non-firm energy. This will allow us to sell on a daily or on an hourly basis when we have more water in any given year that we will utilize for our own consumption. Remembering, of course, that our system is designed to guarantee energy delivery to all of you in the three driest years that we have observed in the last 40. Last year was 90 percent of average and this year it happens to be 108 percent. There is a wide variation in any given year. Last year we net purchased electrical energy and stored it in our reservoirs. Last year all the energy that we did sell to the U.S. was brokered energy from Alberta and from Alcan, and we just utilized our transmission system. We were able to earn about $35 million using unutilized capacity in our transmission system and brokering power to the United States.

It's very common for utilities to exchange capacity, exchange energies, where we have a different timings in terms of demand, time of day, seasonal variations. For example, there is a winter heating peak here in British Columbia while California has a summer air-conditioning peak. These exchanges are possible if we have a free market. This optimizes our systems and puts us in a position as to have as much standby as we would normally need and of course allows us to earn a return. Traditionally, we have not done that except for ourselves. What we are establishing through Powerex is a power pool. We are having independent power producers in this province and they will be able to sell any surplus energy they have into this pool and our major transmission customers, at least in the initial instance, will be able to buy. Now obviously you can't move from a non-firm market to a firm market, they are two different commodities. The non-firm is priced daily. So what we are doing is providing a market for buyers and sellers to meet under a set of rules and to allow B.C. customers, and major consumers, to enter into that market place on a fixed set of rules. We are suggesting and, of course, this is just our recommendation, you can opt in for whatever amount of energy you want; but, you have to opt in for a four-year period. This allows us to adjust our system in response to any changes that a major customer will make. A major consumer in this province will now be on an even footing with other utilities, such as in Alberta or the United States, who heretofore were the only ones who had access to this energy. I said in my opening remarks that I see one of my missions is to break down the monopoly and do as much as possible to expose our operations to market forces. This is just one more step in doing this and will optimize the use of our resources in this province to the benefit of our customers.

Let me talk a little bit about the last couple of days. I thought that Hazel Henderson described my job very well and I've asked her to give me some recommendations with respect to chaos theoreticians and we may be adding somebody like that to my office. Jamie, thank you for describing our policies as those of the radical hippies of the 1960s. It was reassuring.

We talked about choices and trade-offs. That's a message that I don't miss any opportunity to offer to anybody who will listen. Nothing is for free. What we are trying to do with our programs here is to have people make informed choices, but in some way structure these choices, so that they are not making a choice for somebody else. I think that's a key principle. It is very easy to find a big target with deep pockets that will make a choice for you. There have to be some checks and balances in our system so that we understand what choices we are making and are prepared to participate in the reallocation that the choices will necessitate, personally or corporately. We have to keep seeking ways in which to do that.

I can tell you that we are very interested in our conservation and Power Smart programs. We have two goals: save kilowatt-hours and change the ethic through education. It's great to knock the media, and I like doing it, however, the media has aided in some remarkable behaviourial changes in our society: smoking, drinking and driving, exercise, diet - you think of those values that have changed dramatically over 15 or 20 years. We hope that we are able to succeed on that kind of scale with respect to the ethic of conservation. The best advice we have is to teach children starting at grade 4. It's not so easy for you to change your behaviour at your age. We have a little bit of a chance with the young people you saw yesterday from the Secondary School. They are very receptive to the conservation ethic. We will have an education program up and running in the Fall.

I talked about the limits of conservation in my opening remarks and I want to come back to it again because I want to emphasize the fact that there are no budgetary limits. What the limits are is our ability to change behaviours and to change how institutions function. I was delighted this morning to go out to CanFor's two pulp mills and to be greeted by their Regional Vice-President who sat me down in the board room and said, "I hope you don't mind this, but I'd like to show you this thing on our cogeneration." He showed me three or four slides and I said, "Tremendous, we'll make a deal, don't worry about it." However, we had to put that first deal together with Howe Sound Pulp and Paper in order to demonstrate how we could handle these kinds of things. We had to discuss with Howe Sound Pulp and Paper that investing in a cogeneration facility would mean that you would not have the same kind of hurdle investment return rates that is common in the pulp and paper industry because the pulp and paper industry is subject to market forces and cyclical swings and therefore, has a higher risk component to it. We were able to get that concept across just by using that kind of information and discussing that within the industry itself.

We just see these opportunities open up and it's those kinds of things that we need. We need to get into triple net leases. One pays and one benefits with respect to the consumption of energy and buildings. We have to match, in some way and give everybody an incentive. We are working with the Beaumont group who manage most of the commercial floor space in British Columbia and trying to structure some contractual arrangement with them in order to get them interested in conserving energy. What's limiting us is what I call the tyranny of small decisions. I mean it's all very interesting table talk about our rates going up, or that electricity is expensive. But the real truth of the matter is that people don't know. I am wondering how of you here know how much you pay monthly for electricity. I'll bet you, if we took a list and you gave me your number and I checked it on our screen I doubt if 25 percent of you would know. The electricity bill is a very small percent of our income and there's a lot of transaction costs e.g., personal time associated with changing behaviour or taking actions like changing your lighting in your home. We have to find out ways in which we can do it indirectly. We are delighted, as I mentioned, that Sears Canada won't sell anything but Power Smart fridges. That's where we need the change in order to have individuals take those kinds of steps.

I think that we are going to have some impact from rate structuring; but, it was very interesting the evidence that John showed you. The clear response to raising rates is that people forgot about it, and as the rate levelled out, in a relative sense, they declined because they were stable in a period of inflation. There's probably a real decline in rates of 20 or 25 percent during that period. I'm just guessing. People are indifferent again. So perhaps part of the rate structuring will involve bonuses. I mean we are all conscious of those bonuses on our ICBC rates. If you set the rates high and then if you earn bonuses then it's a pat on the back. I think that perhaps a monthly pat on the back will focus people's attention and this would be a good technique to achieve some conservation. There was a lot of discussion on the nature of our mandate and I think Gary Bannerman captured it very well in the context of what every corporation should do and has a responsibility to do, and that is to communicate with the general public, particularly when you have the kind of impact on the population as a Hydro does, or a telephone company, or even a very large economic enterprise in any region. You ought to develop those community linkages, you ought to seek the feedback that Hazel talked about. That's just dog-gone good business and anybody who doesn't do it, they are at risk in my mind of having their corporations mandate removed. You see some of that periodically.

But beyond that, it is not for us to make the decisions and I want to make that very clear. Democracy is breaking out all over globally, as Hazel said, and there is a real reason for that. People want to be involved through their democratic institutions. I feel very strongly that those decisions ought to be made at the political level with all the kinds of forces that play. This will keep our democratic society a very attractive and healthy place to live. I don't see us as taking on that role that perhaps was perceived to have been taken on by utilities previously of sort of the state within the state. I just totally reject that as a concept.

Just before I offer some concluding comments, I just wanted to talk about the hearing process. Some of my friends will not like me saying this; but, quite frankly I think most of the hearings are get rich scheme for lawyers. I think the whole concept of the adversarial nature of these hearings is non-constructive. I think we need to modify the way in which we have hearings, not the fact that we have them but the way in which we do them. I don't think there ought to be funding, quite frankly, for those who wish to present an adversarial view; but, I'm very satisfied with the fact that we would have to fund what is deemed reasonable by whoever the regulatory body is, for the analysis and for the gathering of information which is required to make the decision. What I don't like to do is to give two million dollars, or whatever the defined amount is, to adversarial groups because in a number of situations all you have is their consultant tearing down your consultant. I just wonder how constructive all that is. Indeed I don't wonder. I think it's a horrible waste of resources. Rather than take on an adversarial position, I would be prepared to take a constructive position instead. For example, for any major project, it would be my personal philosophy to say, "Here are the one or two that you can consider, here's why we are putting them forth to you. We can't study all options because we don't have infinite resources and infinite time; but, we think this is a reasonable choice, and here is some data. Would you please examine it and see what else you require for your decision." Put the terms of reference out to the public for criticism, have a properly constituted competition for the work, and proceed to gain that knowledge which everybody will use in a collective sense to reaching a reasonable decision. I don't think that the adversarial process allows us to develop shared values. What I saw here today and yesterday were strongly held views. I saw shared concerns; but, I saw civility and thoughtfulness. It seems to me that we ought to develop a process where we build "shared values" and we modify our behaviour such that it meets the characteristics that I saw here in the last two days.

I'd like to personally thank you very much for your participation and for your words of advice and observation. I am absolutely delighted with what has gone on in the last couple of days. We'll go away and think about some of those observations. Clearly it's given us impetus with respect to certain of the things we are doing. I find myself with more shared values and more unanimity here than I have experienced in my job over the last three years. I hope that we collectively will continue to work on that. Thank you very much.

Closing by Conference Chairman, Chris Boatman

Thank you very much Larry. I think that's a very fitting conclusion to what has certainly been two days of very interesting discussion. Of course these Forums don't just happen, so if you would bear with me for a couple of minutes I'd like to thank some of the people who have put this together.

I'd like to start with the Vancouver Electric Vehicle Association for bringing the electric vehicles to Prince George. I'm sure everybody that took the opportunity to have a "no-charge" ride enjoyed their ride.

I'd like to thank the hotel. I think the facilities were excellent. I know we wondered about moving the Forum out of the Lower Mainland; but, I think it was very well done so I'd like to thank the hotel for their cooperation. They showed amazing flexibility for us moving from room to room, and moving this and moving that.

I'd also like to thank the people of Prince George. We got tremendous local support. I don't know if you are aware; but, the registration process was handled for us by the Prince George United Way and they even manned the registration booth. They are looking after all that aspect for us.

The people who did the recording and the facilitators for the workshops, I would like to thank them for all their efforts. I think they did an excellent job.

I would also like to thank all the staff of B.C. Hydro, Conrad Guelke and his staff who planned, organized, and ensured the success of another Forum for us.

A special thanks to our guest speakers, all the panelists, and the simulation actors as their participation was very much appreciated.

Of course, most of all, I would like to thank you people for taking time out of what I am sure are very busy schedules to take part in what I personally believe is a very important challenge for all of us. I hope that you will come again.

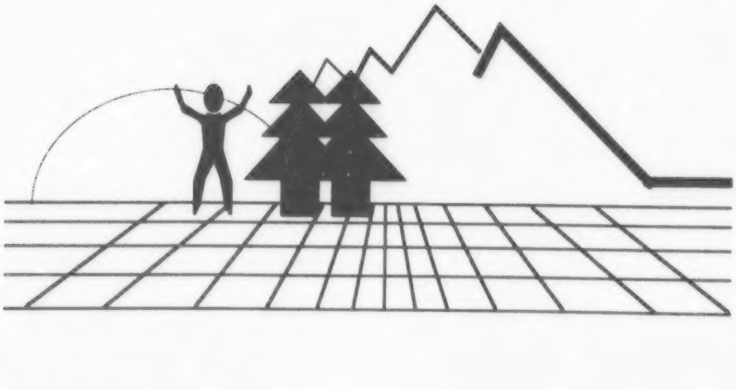
We started these things three years ago and now we find we actually have to plan them more than 12 months in advance. So I can tell you I'd like you to take your calendars out and mark in 16-18 of April, next year, in Victoria. If you enjoyed this year, I look forward to seeing you again next year. So with that, thank you very much and I declare this Forum ended.

THIRD ANNUAL

ELECTRIC ENERGY

FORUM

Lifestyles, the Environment and Electricity Use



HANDOUTS

The Speakers

Hazel Henderson
Futurist

Hazel Henderson is a noted futurist and author. She is the author of "Creating Alternative Futures" and produced, wrote and hosted a television series of the same name which aired on PBS. She also wrote "The Politics of the Solar Age: Alternatives to Economics" as well as numerous articles, monographs, editorials and contributions to anthologies. Hazel Henderson is an activist and founder of many public interest organizations. She has served as a member of the Advisory Council of the U.S. Congress Office of Technology Assessment and on advisory committees of the National Science Foundation and National Academy of Engineering. Ms Henderson has also served on the editorial boards of a number of journals, including Technological Forecasting and Social Change and Futures Research Quarterly. Ms Henderson has received many awards including an honourary doctorate degree from Worcester Polytechnic Institute for her work on alternative economics and technology.

Larry Bell
B.C. Hydro

Larry Bell is the Chairman and Chief Executive Officer of B.C. Hydro. Mr. Bell draws on an extensive background in both the financial and public sector. Prior to his appointment to B.C. Hydro, he spent three years as C.E.O. of Vancouver City Savings Credit Union. In addition, Mr. Bell has served as the provincial Deputy Minister of Finance, Deputy Minister of Lands, Parks, and Housing and Deputy Minister Responsible for Transit. He holds a bachelor's degree in economics and geography from the University of British Columbia and a master's degree in social science from San Jose State College, California Currently, he is a board member of Montreal's Institute of Research on Public Policy, Chairman and C.E.O. of the Vancouver Board of Trade and a member of the Canadian National Committee World Energy Conference. Mr. Bell was 1989 General Campaign Chairman of the United Way of the Lower Mainland.

Chris Boatman
B.C. Hydro

Chris Boatman is the Vice-President of Corporate and Environmental Affairs and Executive Assistant to the Chairman of B.C. Hydro. Between 1965 and 1984 Mr. Boatman was involved in the development of the Peace and Columbia Projects. In 1973 he was appointed Construction Manager for the Peace Canyon and in 1980 Project Manager for Sice C. In 1984, Mr. Boatman was appointed Manager of B.C. Hydro International Ltd., a subsidiary company of B.C. Hydro involved in offshore consulting services. In 1986, Mr. Boatman joined the Office of the Chairman and C.E.O. as Executive Assistant to the Chairman and President and in 1988 he was appointed President and C.E.O. of the British Columbia Power Export Corporation (POWEREX), an agency to coordinate the export of power from British Columbia. Mr. Boatman graduated from the University of London in 1963 with a degree in civil and structural engineering.

John Foster
World Energy Council

John Foster is President of the World Energy Council and a former President of Atomic Energy of Canada Limited. Dr. Foster was a member of the group that produced the feasibility study for Canada's first nuclear powered generating station and has worked on other Candu nuclear power plants around the world. As a member of the Canadian National Committee and the International Executive Council of the World Energy Council, Dr. Foster has studied electricity use and electricity generation throughout the world. Dr. Foster has received a number of awards including the Governor General's medal, the Julian C. Smith medal from the Engineering Institute of Canada and the McNaughton Medal from the Institute of Electrical and Electronics Engineers. He also has honorary doctorates from the Technical University of Nova Scotia and Carleton University.

Irving Fox
University of
British Columbia

Irving Fox is a Professor Emeritus, Community and Regional Planning, at the University of British Columbia. Dr. Fox was a Vice President of Resources for the Future Incorporated, a non-profit, natural resources research organization before joining the academic community, first at the University of Wisconsin and subsequently at the University of British Columbia. Dr. Fox is a political scientist and community and regional planner whose particular area of expertise is in water resource management. He now lives in Northern British Columbia, residing in Smithers, thus bringing a northern perspective and southern experience to our analysis of lifestyles and electricity use.

Ed John
Carrier Sekani
Tribal Council

Ed John is a lawyer, President of Tanizul Timber Limited and a resident of Prince George. Mr. John is the Hereditary Chief of the Lasilyu Clan of the Tl'azt'en Tribe of the Carrier Indian Nation. For four years Mr. John served as Tribal Chief of the Carrier Sekani Tribal Council. Mr. John has held many positions in the Native Indian community and holds directorships in B.C. Rail and the Interior University Society.

Bill Matson
Northwood Pulp
and Timber Ltd.

Bill Matson is Vice President, for Northwood Pulp and Timber Limited and has served as a member of the Executive Board and Chairman of the Technical Section of the Canadian Pulp and Paper Association. He was also on the Board of Directors for the Pulp and Paper Research Institute and President of the Ontario Pulp and Papermakers Safety Association. He held positions with a number of pulp and paper companies before joining Northwood. Mr. Matson graduated from Queen's University with a degree in chemical engineering.

Richard Dalon
Ministry of Environment

Richard Dalon is Deputy Minister, B.C. Ministry of Environment. The ministry is responsible for planning, policy, management and public education on environmental matters. Mr. Dalon is also Chair of the Deputy Ministers' Management Committee for the Canadian Council of Ministers of Environment, Co-Chair of the B.C. Deputy Ministers' Committee on Sustainable Development, Co-Chair of the B.C./Western States Task Force on Oil Spills and a member of other committees on the environment and the economy. Before joining the B.C. government, Mr. Dalon served in the federal Department of Indian and Northern Affairs and in various positions for the government of Alberta.

Tim McDaniels
McDaniels Research Ltd.

Tim McDaniels is President of McDaniels Research Limited and a visiting professor of environmental studies at Western Washington University. He graduated in economics with emphasis on risk management and taught at a number of universities. Dr. McDaniels has received several awards including the President's Research Award from Simon Fraser University and the Mellon Fellowship from Carnegie Mellon University. He specializes in developing decision-making methods for use in analyzing environmental problems for government and industry and has published widely on the subject.

John Elizalde
Bonneville
Power Administration

John Elizalde is Chief of the Residential Programs Branch of Bonneville Power Administration. Mr. Elizalde is a graduate of Wittenberg University with a degree in business administration. He has held a number of positions with Bonneville Power in the environmental fields. Mr. Elizalde has been involved with the commercial and industrial sectors as well as the residential sector where his branch is responsible for the development and implementation of conservation programs through the promotion of energy efficiency.

Ken Peterson
B.C. Hydro

Ken Peterson has been with B.C. Hydro since 1977 and is presently the Director of Planning. His responsibilities as head of the Planning Committee are resource planning and policy analysis. Mr. Peterson has extensive experience in economic evaluation and policy analysis of major issues such as flexible supply planning. He received his master's degree in economics from Northwestern University following a bachelor's degree in economics from U.B.C. He has also worked with the Westwater Research Centre at U.B.C.

Zig Hathorn
B.C. Hydro

"Zig" Hathorn is Manager, Environmental Resources at B.C. Hydro having joined the Environmental Services Section of B.C. Hydro in 1975 after coming from Ontario Hydro. Dr. Hathorn obtained his PhD from Cambridge University in physical chemistry and subsequently joined the Chemistry Department at U.B.C. before becoming a research associate in electrical engineering. He has wide experience in all aspects of environmental protection having worked on many types of projects while at B.C. Hydro.

Walter Hardwick
University of
British Columbia

Walter Hardwick is a professor of geography at the University of British Columbia where he teaches courses in urban studies and political and economic geography. Dr. Hardwick is a former Vancouver alderman. He initiated the "Livable Region Plan" and is currently Chairman of "Choosing Our Future"; both are planning processes for the Greater Vancouver Regional District. He was Deputy Minister of Education and Science and the founding Chairman and Chief Executive Officer of the Knowledge Network.

Jack Davis
Energy, Mines and
Petroleum Resources

The Honourable Jack Davis is an engineer, economist, former member of parliament and currently a minister in the B.C. cabinet. Federally, he served as Minister of Fisheries and Forestry and Minister of Environment. Provincially, he has been Minister of Transportation and Communications as well as Minister of Energy before being appointed to his present position. Dr. Davis is on the Environment and Land Use Committee and other committees of the B.C. Cabinet. Chosen as Canada's Engineer of the Year in 1975, he was also a Rhodes Scholar and is the author of several books.

Rob Kikkert
B.C. Hydro

Rob Kikkert is Marketing Manager, Northern Region, B.C. Hydro. Mr. Kikkert has worked in energy management for the last six years, helping to develop and implement B.C. Hydro's Power Smart conservation programs. This work has included energy audits of both commercial and residential customers. Mr. Kikkert is a graduate of the B.C. Institute of Technology in Electric Power, a director of the Prince George Homebuilders Association and he is on the executive of other community groups.

Gary Bannerman
Bannerline Enterprises Ltd.

Gary Bannerman is a broadcaster and President of Bannerline Enterprises Limited. As one of British Columbia's leading talk show hosts he has interviewed many internationally famous and controversial people and as an investigative reporter he has exposed a number of criminal acts which assisted police in obtaining convictions. Mr. Bannerman has contributed many articles to newspapers, magazines and business publications. He has received many awards including TV Week Viewers Choice Award as best radio talk show host and the Annual Community Service Award from the B.C. Association of Broadcasters. Mr. Bannerman's passions are ships and travel and he is the author of several books on these subjects.

THIRD ANNUAL ELECTRIC ENERGY FORUM

CRITIQUE

General

	Very Good	Good	Fair	Of No Value
Contents of Papers	___	___	___	___
Length of Papers	___	___	___	___
Quality of Information	___	___	___	___

Comments:

What papers did you find particularly informative and useful? ___

Did you find the workshop format useful in providing public input and stimulating discussion? ___

Can you suggest a better method of informing and soliciting opinions from interested parties? ___

Are there any additional subjects you would like covered at future forums? ___

Did you enjoy the Energy Crisis Simulation? ___

Any other comments? ___

Please return this critique
to registration desk

BChydro

Environmental Quiz

How environmentally conscious are you?

This is a two-minute test that will tell you how environmentally minded you really are. Just add up your scores as you go and your answer awaits you at the finish line.

Your score

1 Thinking about your lifestyle and the ways you use electricity, how much attention do you pay to limiting your use of electricity?

A lot of attention	+15	Very little attention	– 5
Moderate attention	+ 5	No attention at all	– 15

____

2 How regularly do you turn off the lights at home and turn down your thermostat when not required?

Regularly	+ 5	Occasionally	0	Never	– 5

____

3 How regularly do you wash your clothes in warm water with a cold water rinse?

Regularly	+ 5	Occasionally	0	Never	– 5

____

4 Have you ever taken any of the following measures specifically to use less electricity? installed home insulation, storm windows, double glazing, weatherstripping or lower wattage lighting?

Yes	+ 5	No	– 5	Renter	0

____

5 How would you rate yourself in terms of practicing environmentally responsible behaviour?

Excellent	+ 10	Fair	0
Good	+ 5	Poor	–10

____

6 Are you participating in any home recycling programs (such as old newspapers or used tins and bottles)?

Always	+10	Never	–10
Occasionally	+ 5	Not available	0

____

7 Are you participating in a recycling program at work?

Always	+10	Never	–10
Occasionally	+ 5	Not available	0

____

8 Do you look to purchase "environmentally friendly" grocery products?

Always	+10	Never	–10
Occasionally	+ 5	Not available	0

____

9 Have you ever undertaken any actions to demonstrate your concern about environmental issues, such as writing to elected officials or newspapers, joining a protest group, attending a hearing on the state of the environment?

Yes	+ 5	No	– 5

____

10 What is your usual means of travelling to work?

Walk or cycle	+15	Carpool	+ 5
Public transportation	+10	Drive own car	– 15

____

Total __________

Scoring

Over 50 points	****	Strong environmental orientation
26 – 50 points	***	Reasonably strong environmental orientation
0 – 25 points	**	Moderate environmental orientation
Fewer than 0 points	*	Weak environmental orientation

Home Check-up

A systems approach to your house

POWER SMART

Welcome To Home Check-up!

Workform Notes

Your home is a complex system which must be examined as a whole. Traditionally, when we were concerned about energy efficiency and high electricity bills, we would look at insulation levels and the quality of windows. We now know that approach is too limited. In order to achieve a higher level of comfort and structural durability, as well as protect our health by maintaining good indoor air quality, we need to take a wider view of our homes.

This Home Check-up workform takes you on a tour of your home looking at the performance of the important systems. You will be asked to score your home based on a detailed analysis of the components and their operation. The workform will take one to two hours to complete depending on the size and complexity of your home and your knowledge of the building.

Should your home score below 50 points on any of the five sections, your should consider remedial work in that area. If you plan to improve the performance of your home, it would be wise to consult a housing professional for advice. There are also a wide array of educational materials which will be of assistance if you plan to do some work yourself. You should also contact B.C. Hydro for the latest information on our Power Smart programs.

The Home Check-up workform was developed by Sheltair Scientific of Vancouver and is currently receiving excellent reviews across North America. The format is still under development and we would be pleased to receive your comments. Please direct them to Jay Lewis, Program Manager, Residential Retrofit Program, Power Smart, 1045 Howe Street, 6th Floor, Vancouver, B.C. V6Z 2B1 Tel. 663-3770.

RR responsible retrofit

HOME SCORE CARD SUMMARY AND CERTIFICATE

This is to certify that as of ______________ ,19 ___ , the house at:

____

achieves the following score for each stated performance criteria:

MOISTURE CONTROL

☐ Not scored

Awful	.	.	.	.	.	.	.	.	.	Ideal
0	10	20	30	40	50	60	70	80	90	100

CHIMNEY PERFORMANCE

☐ Not Scored

Awful	.	.	.	.	.	.	.	.	.	Ideal
0	10	20	30	40	50	60	70	80	90	100

VENTILATION AND AIR QUALITY

☐ Not Scored

Awful	.	.	.	.	.	.	.	.	.	Ideal
0	10	20	30	40	50	60	70	80	90	100

COMFORT AND THERMAL EFFICIENCY

☐ Not Scored

Awful	.	.	.	.	.	.	.	.	.	Ideal
0	10	20	30	40	50	60	70	80	90	100

HEATING AND COOLING SYSTEMS

☐ Not Scored

Awful	.	.	.	.	.	.	.	.	.	Ideal
0	10	20	30	40	50	60	70	80	90	100

Rated by: ______________________________ Initials: ________

House Scores are intended to provide homeowners with assistance in comparing the performance of their house with other houses, and with identifying features of the house requiring improvement. This certificate, and information in the related reports and forms, is for information purposes only, and is not a warranty for any purpose whatever. No liability is assumed by individuals or companies who have participated in scoring the house.

DETAILED SCORECARD: *MOISTURE CONTROL*

THIS SCORE CARD RATES A HOUSE IN TERMS OF ITS ABILITY TO:
AVOID EXCESSIVE CONDENSATION ON INTERIOR SURFACES AND WITHIN WALL AND CEILING CAVITIES.

USE THIS SCORE CARD WHEN:

- Conducting a comprehensive house assessment; or
- Eliminating an open flue; or
- Wrapping walls of a house with an air barrier; or
- Air sealing attics and other large areas of house; or
- Reducing temperatures indoors through setbacks or zone control; or
- Adding humidification system.

PROCEDURE:

To score the house, use your best judgement to assess how well the house meets each of the performance criteria described below. Then simply add up the points. Examples are provided to help score each criteria. Give partial points for questionable situations.

An ideal score for Moisture Control is 100 points.

For houses with less than 50 points, remedial work is a high priority. Look for cost-effective ways to increase the score. More detailed inspections and testing also may be worthwhile.

ASSESS how well the house AVOIDS GENERATING TOO MUCH MOISTURE indoors. *Max.* **8** *Assessed:*

Possibilities:	*Max.*	*Assessed*
basement drain has an air-tight cover (or is vented to outdoors)	2	
outlet exists for venting a clothes dryer outdoors if occupants so wish	5	

Possibilities:	*Max.*	*Assessed*
sump pit is not present, or if present sump is tightly covered or vented to outdoors	3	

ASSESS how well the house KEEPS OUT MOISTURE from ground. *Max.* **10** *Assessed:*

Score zero points for this section if:
1. More than half of the foundation walls or the basement crawl space floor are composed of exposed dirt, stone, or rubble (a crawl space can be excluded only if it is vented to outdoors and contains no uninsulated heating ducts);or
2. There is definite evidence of recent ground water entry (look for efflorescence, staining or wet wood next to concrete).

Otherwise score partial points, up to a maximum of 10, for each of the following:

Possibilities:	*Max.*	*Assessed*
ground next to house on all sides is sloped so as to drain rain water away from house	2	
house has adequate gutters on all sides	2	
gutters discharge water away from foundation walls, or into a drainage system	2	
foundation walls are insulated on the exterior	5	

Possibilities:	*Max.*	*Assessed*
concrete foundation walls and floor area is covered with moisture-resistant materials (plywood, polyethylene, vinyl, rubber-backed carpets, oil-based paint)	5	
soils in area are dry and well-drained with no history of flooding or ponding	3	
floor area of basement or heated crawl space is covered by concrete or by a moisture barrier	5	

ASSESS how well the **INTERIOR SURFACES** are kept warm. *Max.* **22** *Assessed:*

Possibilities:	*Max.*	*Assessed*
double-glazing or better on all windows	5	
wood, PVC, or thermally-broken window frames	3	
window sashes are weather-stripped or obviously very tight	2	
no significant areas of exposed floors, or exposed floors are insulated or carpeted	2	
forced-air distribution system operates continuously	2	
forced-air registers are fully or partially open in all rooms	2	

Possibilities:	*Max.*	*Assessed*
exterior walls and all ceiling areas are known to be insulated	4	
all closet walls are interior walls, or closets located against exterior walls have louvred or under-cut (1/2") doors	2	
average indoor temperature is 20°C (68°F) or greater	2	
Bonus Points Given for:		
sealed double-glazed window units	2	
heat supply is below windows in most rooms	2	

ASSESS how well the house keeps indoor air from entering **WALL AND CEILING CAVITIES.** *Max.* **20** *Assessed:*

Possibilities:	*Max.*	*Assessed*
house NLA is less than 2 cm^2/m^2 (this requires a blower door test)	20	
house is constructed with an air/vapour barrier; or house is built within last 25 years	3	
electrical outlets are fitted with poly-pans or gaskets, or are painted/caulked to wall	2	
house has no pot lights, or pot lights are boxed and tightly caulked in attic	2	
trim around windows, doors, and upper walls have been sealed tightly to walls with paint or sealants	3	
ventilation system avoids constant pressurization of house (pressurization occurs if a fan or furnace blower, connected to a fresh air duct, is running continuously in winter, and is not balanceed by an exhaust fan	3	

Possibilities:	*Max.*	*Assessed*
plumbing entrances/exits have been specially sealed (under sinks, vents to attic)	2	
no ductwork is located in attic space, or duct work is thoroughly taped/sealed and insulated	3	
attic has no turbine or powered ventilation	2	
Bonus Points Given for:		
attic shows no evidence of serious moisture staining or wood rotting (must look in attic to score)	3	
eaves and upper wall surfaces on outside of house show no evidence of recent moisture migration (paint blistering, staining)	2	

ASSESS how well the wall and ceiling CAVITIES CAN DRY OUT once wet. *Max.* **10** *Assessed:*

Possibilities:	*Max.*	*Assessed*
exterior walls are brick or unsealed siding (heavily painted wood siding or tight vinyl/metal siding should be considered sealed	3	
exterior cladding has 1/4" or greater gap along bottom and top of wall or air vents have been installed in at least every third stud space	3	

Possibilities:	*Max.*	*Assessed*
attic ventilation is present for all attic spaces	3	
attic ventilation includes some soffit vents	2	

ASSESS how well the house can REMOVE HUMID INDOOR AIR. *Max.* **20** *Assessed:*

Possibilities:	*Max.*	*Assessed*
operable exhaust fan in main bathroom	4	
bathroom fan is reasonably quiet and suitable for continuous operation	4	
operable exhaust fan in kitchen (vented to outdoors)	4	
kitchen fan is reasonably quiet	4	

Possibilities:	*Max.*	*Assessed*
heat recovery ventilation or control exhaust ventilation with inlets in bathroom and kitchen	16	
all, or some, exhaust is controlled by a dehumidistat	6	
bathroom with exhaust fan has doors that are under-cut by 1/2" or more	1	

ASSESS how well the house KEEPS OUT RAIN AND SNOW. *Max.* **10** *Assessed:*

Score zero points for this section if:
house shows evidence of recent rain entry (look for staining of interior finishes, or signs of water in exposed joists)
Otherwise score points for features as indicated below.

Possibilities:	*Max.*	*Assessed*
flashing and flexible caulking around exterior window openings	2	
flashing and flexible caulking is apparent around vents and behind chimneys	2	
no large gaps, splits or entry routes through siding	2	

Possibilities:	*Max.*	*Assessed*
attic has no roof turbine vents and any gable vents are well covered and shielded	2	
Bonus Points Given for:		
a wall assembly that is unlikely to absorb or draw moisture into closed cavities (eg. a vented exterior cladding followed by an air space and building paper or equivalent)	4	

TOTAL SCORE

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DETAILED SCORECARD: *CHIMNEY PERFORMANCE*

THIS SCORE CARD RATES A HOUSE IN TERMS OF ITS ABILITY TO:

MINIMIZE OR ELIMINATE THE POTENTIAL FOR COMBUSTION GASES TO SPILL INDOORS.

USE THIS SCORE CARD WHEN:

- Conducting a comprehensive house assessment; or
- Installing exhaust fans; or
- Wrapping walls of a house with an air barrier; or
- Air sealing attics and other large areas of house; or
- Converting to gas or wood heating.

PROCEDURE:

To score the house, use your best judgement to assess how well the house meets each of the performance criteria described below. Then simply add up the points. Examples are provided to help score each criteria. Give partial points for questionable situations.

An ideal score for chimney performance is 100 points.

For houses with less than 50 points, remedial work is a high priority. Look for cost-effective ways to increase the score. More detailed inspections and testing also may be worthwhile.

A house automatically receives the full 100 points if all heating equipment is:

- non-combustion (eg. electric baseboards); or
- sealed combustion (eg. a condensing furnace with a direct outdoor combustion air supply); or
- located outside the envelope (eg. a gas-fired heat pump); or
- if a Chimney Assessment Procedure (CAP) or a Chimney Backdraft Test indicates no major problems.

ASSESS how well the **PRIMARY HEATING SYSTEM** keeps combustion gases away from the living areas. *Max.* **25** *Assessed:*

Score points for the possibility that best describes the system. Add bonus points as warranted.

Possibilities:	*Max.*	*Assessed*
non-combustion, sealed combustion, or appliance outside of envelope	25	
induced-draft furnace using indoor air for combustion	20	
oil furnace with Riello or other high pressure burner	15	
standard oil furnace (or boiler) in good condition	5	

Possibilities:	*Max.*	*Assessed*
standard gas furnace (or boiler) in good condition	3	
Bonus Points Given for:		
oil furnace with a flue pipe without a barometric damper	5	
oil furnace with standard burner and a delayed-action valve	5	
spillage alarm or venting fail-safe system	8	

ASSESS how well the **DOMESTIC HOT WATER** system keeps combustion gases away from the living areas. *Max.* **5** *Assessed:*

Score points for the possibility that best describes the system. Add bonus points as warranted.

Possibilities:	*Max.*	*Assessed*
non-combustion, sealed combustion, or appliance outside of envelope	5	
induced-draft water heater using indoor air for combustion	4	
oil water heater with Riello or other high pressure burner	3	
standard oil water heater in good condition	1	

Possibilites:	*Max.*	*Assessed*
standard gas water heater in good condition	1	
Bonus Points Given for:		
oil water heater flue pipe without a barometric damper	1	
oil water heater with standard burner and a delayed-action valve	1	

ASSESS how well the **PRIMARY CHIMNEY** maintains draft. *Max.* 10 *Assessed:*

Possibilities:	*Max.*	*Assessed*
both the primary heating system and the hot water system are non-combustion, sealed combustion, sidewall vented or located outside of envelope	10	
chimney is insulated or is located on an interior wall	5	
flue pipe is airtight (eg. sealed, caulked, or taped)	3	

Possibilities:	*Max.*	*Assessed*
flue pipe is insulated or double-lined metal	1	
chimney extends above ridge of house and trees within 10 feet	1	
Vertical portions of chimney appear airtight (eg metal-lined, or masonry with tight mortar, clean-cut, and junctions	2	

ASSESS how well any **OPERABLE FIREPLACES OR WOODSTOVES** keep combustion gases away from the living areas. *Max.* 20 *Assessed:*

If no fireplaces or woodstoves exist, score the full 20 points for this section. Otherwise, score points for the possibility that best describes the system. Add bonus points as warranted.

Possibilities:	*Max.*	*Assessed*
no fireplaces or woodstoves	20	
firebox with all combustion air supplied directly from outdoors and with gasketed ceramic, steel or cast iron doors	20	
wood or gas firebox with all combustion air supply from outdoors	15	
wood or gas firebox with a portion of combustion air supply from outdoors	10	
fireplace with gas-log insert or 100% natural gas fireplace	10	

Possibilities:	*Max.*	*Assessed*
wood or gas fireplaces with airtight, gasketed doors on firebox without outdoor air supply	5	
wood or gas fireplace with standard non-gasketed glass doors	2	
Bonus Points Given for:		
carbon monoxide alarm installed in the same area of house	8	
chimney is either lined and insulated or is located next to an interior wall	5	

ASSESS how well the **HOUSE SUPPLIES AIR** to make up for air that may be exhausted from the house. *Max.* 40 *Assessed:*

Score the full 40 points if no exhaust fans are present. Otherwise score points for each possibility that applies.

Possibilities:	*Max.*	*Assessed*
balanced ventilation only (paired supply and exhaust fans)	25	
imbalanced exhaust consists of only small, low capacity fans (eg. only 1, 2, or 3 bath fans or only a clothes dryer, or only a range hood with 4" or 5" diameter duct)	25	
make-up air duct connected to supply fan or a continuously operating return air plenum	10	

Possibilities:	*Max.*	*Assessed*
each passive make-up air duct (4" or 5" diameter) (6" diameter)	 3 6	
an obviously leaky house (no window weatherstripping, unsealed sill plate)	10	
fail-safe system on supply fans that shuts down exhaust or alerts householder	15	

TOTAL SCORE

RR responsible retrofit

DETAILED SCORECARD: *VENTILATION AND AIR QUALITY*

THIS SCORE CARD RATES A HOUSE IN TERMS OF ITS ABILITY TO:
PROVIDE FRESH, HIGH QUALITY AIR TO OCCUPANTS;
REMOVE COMMON INDOOR POLLUTANTS BEFORE THEY BUILD UP; AND
MINIMIZE ENTRY OF HAZARDOUS POLLUTANTS FROM BUILDING MATERIALS OR FROM OUTDOORS.

USE THIS SCORE CARD WHEN:

- Conducting a comprehensive house assessment; or
- Installing exhaust fans; or
- Wrapping walls of a house with an air barrier; or
- Air sealing large areas (eg. windows, attics); or
- Converting to gas or wood heating.

PROCEDURE:

To score the house, use your best judgement to assess how well the house meets each of the performance criteria described below. Then simply add up the points. Examples are provided to help score each criteria. Give partial points for questionable situations.

An ideal score for Ventilation and Air Quality is 100 points.

For houses with less than 50 points, remedial work is a high priority. Look for cost-effective ways to increase the score. More detailed inspections and testing also may be worthwhile.

ASSESS how well the house supplies FRESH, HIGH-QUALITY AIR to living and sleeping areas. *Max.* 30 *Assessed:*

Possibilities:	*Max.*	*Assessed*
a system exists for supplying fresh, outdoor air to each bedroom (eg. fresh air duct connected to a forced air distribution, wall-mounted fresh air inlets, window slots)	15	
a system exists for supplying fresh, outdoor air to living areas other than bedrooms (eg. living room, dining room)	5	
fresh outdoor air is supplied in a way that is likely to avoid uncomfortably cool drafts (eg. air is warmed by a duct heater, by mixing with house air in a forced-air plenum or utility room; by outlets located on high wall; by a heat recovery ventilator)	10	
fresh outdoor air is filtered through a high quality air filter (eg. electric, electro-static, or 40% pleated fabric filters)	2	

Possibilities:	*Max.*	*Assessed*
indoor air is circulated by a continuously operating fan or furnace blower	2	
indoor air is filtered through a high-quality air filter	5	
interior doors throughout the house are undercut or otherwise capable of allowing an easy flow of air thoughout the house	2	
fresh air intake(s) is located away from heavy traffic areas, parking areas, or other potential pollutant sources	5	

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ASSESS how well the **HOUSE CAN ACHIEVE DESIRED AVERAGE VENTILATION** rates. *Max.* 30 *Assessed:*

Score points for mechanical systems with one or more of the possibilities listed below. If no mechanical system exists, score bonus points as warranted.

Possibilities:	*Max.*	*Assessed*
central exhaust ventilator (CEV) or heat recovery ventilator (HRV)	15	
operable kitchen or bathroom exhaust fan vented to outdoors	5	
kitchen or bathroom exhaust fan is quiet and suitable for continuous operation	5	
maximum air flow through CEV, HRV, or exhaust fan(s) totals at least 40 L/s (80 cfm) at highest speed (this must be measured somehow to score)	5	
fresh air duct is unrestricted and connected to a supply fan or to a return air plenum of forced-air distribution system:		
6" diameter	5	
5" diameter	3	
4" diameter	2	

Possibilities:	*Max.*	*Assessed*
operation of ventilation system is automatic (eg. motorized damper on a duct, or dehumidistat or thermostat connected to a fan)	5	
ventilation rate can be easily adjusted by occupants (eg. an accessible and adjustable speed control, thermostat, or dehumidistat, or adjustable, manual damper)	5	
Bonus Points (given only for house without a forced air supply system):		
windows sashes on main floor of house are definitely leaky	2	
house has an "active flue" (eg. a typical furnace chimney using indoor air for draft and combustion)	5	
windows can be opened in each habitable room	2	

ASSESS how well the house keeps out **RADON AND SOIL GASES.** *Max.* 5 *Assessed:*

Score the full 5 points if the foundation is exclusively slab-on-grade, or a vented crawl space or a basement with sub-slab ventilation;
Otherwise score partial points for each possibility that applies.

Possibilities:	*Max.*	*Assessed*
a number of other houses in the neighbourhood have been tested for radon and all have shown radon levels below the guidelines for indoor air; OR tests in this house have indicated a low probability for radon levels above the guidelines	3	

Possibilities:	*Max.*	*Assessed*
basement drain is air sealed to prevent soil gases from entering house (while still draining water)	2	
foundation is mostly uncracked concrete; or cracks in concrete below grade have been specially air sealed, including the slab/foundation joint	2	

ASSESS how well the house avoids letting **HAZARDOUS POLLUTANTS** mix with indoor air. *Max.* **25** *Assessed:*

Possibilities:	*Max.*	*Assessed*
electric range is vented to outdoors	3	
gas range and oven are vented to outdoors	8	
gas range has automatic spark ignition	2	
no exposed particle boards or decorative plywoods less than about ten years old have been used indoors; OR particle boards and decorative plywoods have been painted on all exposed surfaces and edges	5	

Possibilities:	*Max.*	*Assessed*
the house does not have an attached garage; OR penetrations and entranceways between house and attached garage are obviously airtight	3	
house has a separately ventilated closet, shed, garage, or other location suitable for storing paint cans, cleaners, pesticidesand cleaning products away from living areas and fresh air supplies	2	
cooking appliances in kitchen are electric (or no natural gas or proprane stoves are present)	7	

ASSESS how well the house can avoid **EXCESSIVELY DRY INDOOR AIR.** *Max.* **10** *Assessed:*

Score the full 10 points if the house is located in a region with a humid climate (like St. John's or Vancouver). Otherwise score points for each possibility that applies.

Possibilities:	*Max.*	*Assessed*
a central humidification system in good condition	6	
humidification system has an accessible, easily-adjusted control system	2	

Possibilities:	*Max.*	*Assessed*
humidification system is designed to avoid growth of micro-organisms (eg. a steam or spray system)	2	
humidification system is easy to clean and maintain and if designed to spray water uses water known to be asbestos free	2	

TOTAL SCORE

RR responsible retrofit

DETAILED SCORECARD: *COMFORT AND THERMAL EFFICIENCY*

THIS SCORE CARD RATES A HOUSE IN TERMS OF ITS ABILITY TO:

MINIMIZE COSTS OF HOME HEATING AND AIR CONDITIONING; AND
ACHIEVE A COMFORTABLE INDOOR ENVIRONMENT BY ELIMINATING COLD DRAFTS AND COLD SURFACES

USE THIS SCORE CARD WHEN:

- Conducting a comprehensive house assessment; or
- Investigating opportunities for reducing fuel bills and improving comfort; or
- Completing a retrofit strategy for an entire house; or
- Planning a major renovation project.

PROCEDURE:

To score the house, use your best judgement to assess how well the house meets each of the performance criteria described below. Then simply add up the points. Examples are provided to help score each criteria. Give partial points for questionable situations.

An ideal score for Energy Efficiency and Comfort is 100 points.

For houses with less than 50 points, remedial work is a high priority. Look for cost-effective ways to increase the score. More detailed inspections and testing also may be worthwhile.

In houses where walls, windows, attics, or other components are not of uniform construction, score points for each construction type, in proportion to its percentage of the total.

ASSESS the thermal efficiency of FOUNDATIONS

Max: **30** *Assessed:*

Score points for the foundation type that best describes the house.
Add bonus points as warranted (for that foundation type only).
(If more than one type of foundation exists, score both types separately, then average the two scores in proportion to their fraction of the total foundation area..)

Possibilities:	*Max.*	*Assessed*
FOUNDATION TYPE: SURFACE FOUNDATION (eg. slab-on-grade)	20	
Bonus Points (for surface foundation only):		
perimeter insulated:		
12" down	2	
24"-36" down	4	
48" or more down	6	
12" or more down and 24" or more out	6	
1 meter of floor next to edge insulated with:		
R7	7	
R10	8	
R15	9	
centre of floor insulated with:		
R7	5	
R10	6	
R15	7	
floor covering is:		
carpet with foam/rubber backing	1	
carpet with underlay	2	
FOUNDATION TYPE: Exposed floor over unheated crawl space or garage	0	
Bonus Points (for exposed floor only):		
enclosed joist cavities (eg. plywood or poly)	3	

Possibilities:	*Max.*	*Assessed*
partially insulated joist cavity	10	
fully insulated joist cavity	15	
area below floor is closed-up and unvented during winter months	5	
penetrations through floor are sealed airtight	5	
FOUNDATION TYPE: Heated crawl space	where crawl space is primarily above / below grade 10 / 15	
Bonus Points (for heated crawl space only):		
wall insulation:		
none	1 / 1	
R7	3 / 2	
R10	5 / 4	
R15	7 / 6	
R20	9 / 7	
header joist insulation:		
R7	1 / 1	
R10 or better	2 / 2	
insulation boards under exterior siding or against interior concrete:		
½" expanded polystyrene	1 / 1	
1" expanded polystyrene	2 / 2	
2" expanded or 1" extruded polystyrene	4 / 3	

CONTINUED ON NEXT PAGE

ASSESS the thermal efficiency of FOUNDATIONS

CONTINUED

Foundation Type: Heated Crawl Space cont'd

Bonus Points Given for	*Max.*	*Assessed*
cracks around header joist and sill plate have been sealed with a flexible sealant or foam.	5 / 5	
plumbing and wiring penetrations have been sealed	2 / 2	
perimeter insulated:		
12" down	2	
24"-36" down	4	
48" or more down	6	
12" or more down and 24" or more out	6	
1 meter of floor next to edge insulated with:		
R7	7	
R10	8	
R15	9	
centre of floor insulated with:		
R7	5	
R10	6	
R15	7	

Possibilities:	*Max.*	*Assessed*
	where basement is primarily above / below grade	
FOUNDATION TYPE: **Full Height Basement**	0 / 10	
Bonus Points (for full height basement only):		
enclosed joist cavities (eg. plywood or poly)	3	
partially insulated joist cavity	10	
fully insulated joist cavity	15	
floor covering is carpet with foam backing or underlay;	2 / 1	
OR		
sleeper floor over slab;	4 / 2	
OR		
insulation above or below slab	6 / 3	

ASSESS the thermal efficiency of ABOVE-GRADE WALLS.

Max. 25 *Assessed:*

Score full points for each possibility that applies.

Possibilities:	*Max.*	*Assessed*
wall assembly is: masonry, plaster and strapping;	0	
OR		
wood frame and plywood sheathing;	2	
OR		
wood frame and plank sheathing	3	
cavity insulation (if present):		
R7	5	
R12	7	
R20	9	
insulated sheathing under exterior siding (if present):		
½" expanded polystyrene	2	
1" expanded polystyrene	4	
2" expanded or 1" extruded polystyrene	6	
airtightness of wall assembly: tight sheathing (plywood, foamboard);	2	
OR		
air barrier with taped joins;	4	
OR		
stucco in good condition	4	

Possibilities:	*Max.*	*Assessed*
airtightness of interior trim: no special measures;	0	
OR		
flexible sealants applied around perimeter of floors, windows, doors, tubs, cabinets, and penetrations;	6	
OR		
leak inspection with blower door and smoke tube indicates no significant leakage areas;	6	
OR		
blower door test indicates house is tight (eg. NLA < $2cm^2/m^2$)	6	
Bonus Points Given for:		
a one-storey house with or without insulation	3	
OR		
a multi-storey house with insulated wall cavity or insulated sheathing	3	

ASSESS the thermal efficiency of **CEILING AREAS.**

Max. 20 *Assessed:*

Score points for each possibility that applies.

Possibilities:	*Max.*	*Assessed*
score one point for each inch of insulation depth, up to to a maximum of 10 inches	10	
insulation is of even depth and without obvious gaps (to score, attic space must be visually inspected or scanned with a thermographic camera)	1	
attic is airtight (house NLA is less than 2 cm^2/m^2); OR special attention has been given to air sealing attic space(s) including the wall plates, wiring, plumbing, chimney chase and pot light penetrations	5	

Possibilities:	*Max.*	*Assessed*
attic hatch is sealed off or located outdoors or is insulated, weatherstripped, and latched tight	1	
attic floor or ceiling has a continuous air barrier (polyethylene or gasketed, painted drywall/plaster)	2	
continuous air barrier (if present) has been sealed at joins and edges (eg.overlapped and calked poly or gasketed drywall)	3	

ASSESS thermal efficiency of **WINDOWS AND GLASS DOORS.**

Max. 20 *Assessed:*

Score points for each possibility that applies.
Add bonus points as warranted.
If windows vary a lot, consider scoring each window separately and averaging to acheive a final score.

Possibilities:	*Max.*	*Assessed*
glass composition:		
sealed triple-glazed (or double with louvre)	10	
sealed double with ½" or more air space	8	
sealed double with less than ½" air space	7	
single glazed with storms or sashless sliders	4	
single glazed only (no storms)	0	
frames are wood or manufactured with thermal breaks	3	

Possibilities:	*Max.*	*Assessed*
sash is sealed shut, or is effectively weatherstripped (inspect carefully); or sash is shown to be airtight using a blower door and smoke pencil; or windows are new and have been certified airtight in accordance with CSA standard	6	
Bonus Points Given for:		
south-facing windows have overhangs (or deciduous shade trees) for blocking direct sunlight in summer, but not in winter	5	

DETAILED SCORECARD: *HEATING AND COOLING SYSTEMS*

THIS SCORE CARD RATES A HOUSE IN TERMS OF ITS ABILITY TO:

MINIMIZE COSTS OF HOME HEATING, HOT WATER HEATING, AND AIR CONDITIONING; AND ACHIEVE A COMFORTABLE INDOOR ENVIRONMENT THROUGH BALANCED AND EFFICIENT HEATING AND COOLING SYSTEMS.

USE THIS SCORE CARD WHEN:

- Conducting a comprehensive house assessment; or
- Investigating opportunities for reducing fuel bills and improving comfort; or
- Completing a retrofit strategy for an entire house; or
- Estimating costs and benefits for any major retrofit/renovation project; or
- Servicing or replacing the heating appliance; or
- Assessing potential for a Total Tune-Up.

PROCEDURE:

To score the house, use your best judgement to assess how well the house meets each of the performance criteria described below. Then simply add up the points. Examples are provided to help score each criteria. Give partial points for questionable situations.

An ideal score for Heating and Cooling Systems is 100 points.

For houses with less than 50 points, remedial work is a high priority. Look for cost-effective ways to increase the score. More detailed inspections and testing also may be worthwhile.

A high score is particularly beneficial for houses that score low on the Comfort And Thermal Efficiency Scorecard, and for houses in areas where fuel costs may be high.

ASSESS how effectively SPACE HEATING APPLIANCES produce heat. *Max.* **35** *Assessed:*

Score points for the one possibility that best describes the appliance. Add bonus points as warranted.
For houses with two space heating appliances (eg. an oil furnace and a wood stove), score both appliances and average the score. To average this score take a percentage of each score according to:
1). expected use, or
2) ratio of floor areas heated by each appliance, or
3) standard practice, which is 80% of score for the PRIMARY (or CENTRAL appliance), and 20% of score for the SECONDARY heating appliance.

Possibilities:	*Max.*	*Assessed*
electrical or gas heat pumps	35	
electric resistance heaters (furnace, baseboard, or radiant)	25	
high-efficiency, condensing, gas-fired or oil-fired appliances	25	
mid-efficiency, induced-draft gas-fired appliances	15	
oil-fired appliance with a high-pressure (eg. Riello) oil burner	15	
oil-fired appliance with a retention-head burner	5	
conventional oil burner and furnace (or boiler) in good condition	2	
conventional gas furnace (or boiler) in good condition	2	
wood-fired appliance with airtight firebox and dampered air supply	5	

Possibilities:	*Max.*	*Assessed*
conventional wood fireplace with or without doors	0	
Bonus Points Given for:		
gas or oil burner measures 75% or better combustion efficiency; OR has proof of being cleaned and tuned within previous 5 years	5	
a spark ignition on a gas appliance	2	
an automatic flue damper (thermal or electric) on a gas or oil appliance	3	
an oil burner equipped with a delayed-action solenoid valve on the oil line	3	
an oil appliance and chimney that are designed to operate WITHOUT a barometric damper	3	
a catalytic burner on a wood stove	2	
an automatic combustion control regulator on a wood burner	3	

ASSESS the thermal efficiency of DOORS.

Max. 5 *Assessed:*

Score points for the one component that best describes the door.
Add bonus points as warranted (if the door is properly weatherstripped).

Possibilities:	*Max.*	*Assessed*	*Bonus Points Given for:*	
door composition: wood frame with single layer plywood panel;	0		door jambs are effectively weatherstripped	1
OR wood frame with hollow core or 1" solid core;	1		door thresholds are effectively weatherstripped	1
OR metal or fibreglass with insulated cavity	3			

TOTAL SCORE

ASSESS how efficiently the SPACE HEATING SYSTEM(S) supply heat to where it is needed. *Max.* 25 *Assessed:*

Score points for each possibility that applies. Average points for houses with two space heating appliances.

Possibilities:	*Max.*	*Assessed*
heating system does not require a distribution system because heat is produced in ALL of the major living areas and bedrooms (eg. baseboard electric heaters)	20	
system produces heat in some of the major living areas and bedrooms:		
2 to 4 rooms	10	
5 to 10 rooms	15	
system has at least one programmable thermostat	5	
system has zone controls operated by separate thermostats	5	
an exterior thermostat is used to modulate boiler water temperature	5	

Possibilities	*Max.*	*Assessed*
operable, easily accessible and adjustable balancing dampers or valves are present in most rooms	5	
heating ducts and pipes are not located in semi-heated or unlived-in areas (except for crawl space or basement areas that remain cool all winter) OR heating ducts or pipes have been well insulated	5	
forced-air distribution ducts have been sealed with foil tape or hard-case sealant (less points for partial duct sealing)	5	
circulating blowers or pumps are designed to operate continuously during heating season	10	

ASSESS how efficiently the WATER HEATER produces domestic hot water. *Max.* 20 *Assessed*

Score points for the one possibility that best describes the water heater.
Add bonus points as warranted.

Possibilities:	*Max.*	*Assessed*
electric resistance water heater	12	
sealed combustion gas-fired water heater	10	
mid-efficiency, induced-draft, gas-fired water heater	6	
oil-fired appliance with a high-pressure (eg. Riello or Econotec) oil burner	7	
oil-fired appliance with retention-head burner	3	
conventional oil- or gas-fired water heater	1	

Possibilities:	*Max.*	*Assessed*
gas or oil burner measures 75% of efficiency, or better combustion efficiency, or has proof of being installed or tuned and cleaned within previous 5 years	2	
Bonus Points Given for:		
solar panel used for summer heating	3	
oil-fired burner with a delayed-action solenoid valve on the oil line	1	
oil-fired appliance and chimney designed to operate without a barometric damper	1	

ASSESS how efficiently the **WATER HEATER** stores and supplies hot water. *Max.* **5** *Assessed:*

Score points for each possibility that applies.

Possibilities:	*Max.*	*Assessed*	*Possibilities*	*Max.*	*Assessed*
on-demand hot water systems (no storage)	4		point-of-use hot water system (water is heated adjacent to faucet)	1	
storage tank with R10 or better	3				
insulated hot water pipes at least first three feet from storage tank	1				

ASSESS how efficiently the **AIR CONDITIONING SYSTEM** extracts heat from the house in summertime. *Max.* **15** *Assessed:*

Score points for the one possibility that best describes the system.
Add bonus points as warranted.

Possibilities:	*Max.*	*Assessed*	*Bonus points given for:*	
cooling is achieved by "natural" ventilation system (no heat pump is present) consisting of at least two openable, screened windows, located on opposite walls	6		heat pump equipped with a programmable thermostat	3
permanent outdoor air supply ducts(s) connected to a supply fan or blower and controlled by a switch or thermostat suitable for summer operation	6		heat pump is combined with forced-air system AND ducts are insulated where they pass through unlived-in areas	1
house has one or more air conditioning (heat pumps) units installed:			heat pump located directly in room that requires cooling	1
before 1975	8		heat pump room unit is reasonably quiet	1
1976 to 1986	10		windows that are part of a "natural" ventilation system and can be left open without causing a security risk	2
after 1986	12			

TOTAL SCORE

RR responsible retrofit

Coast Inn of the North's Power Smart attitude makes it a natural choice to host the Electric Energy Forum.

Before the Coast Inn of the North was selected to host this week's Electric Energy Forum in Prince George, hotel general manager Alistair McLean had already experimented with energy-efficient lighting. Guests were pleased with the appearance and quality of the new lighting, and McLean was pleased too. Now, he's replacing the Coast Inn of the North's incandescent lighting with Power Smart compact fluorescent fixtures, and planning to install new high-efficiency electric motors in place of worn existing units.

POWER SMART

McLean calculates that the hotel will save over $18,000 annually on lighting alone. Over the expected lifetime of the fixtures, McLean figures on savings totalling $150,000.

Coast Hotels' management saw the merit in McLean's electric energy efficiency strategy at the Coast Inn of the North, and now the B.C.-based chain is planning to implement Power Smart measures around the province.

Alistair McLean, General Manager, Coast Inn of the North

Steps like those being taken at the Coast Inn of the North also reduce overall electric demand and help delay the need to develop new sources of electric energy. Alistair McLean and Coast Hotels. Power Smart. And profit wise.

For more information on the many ways your company can profit from being Power Smart, call one of these B.C. Hydro toll-free numbers:

Northern B.C.		1-800-663-1689
Lower Mainland		1-800-663-0431
Vancouver Island		1-800-663-1033
South Interior	Vernon	1-800-663-2723
	Cranbrook	1-800-663-4306

Coast Hotels

BC hydro

Issues

Hydro in tune with conserver society

Third Energy Forum attracts over 200 people to Prince George

Keynote speaker Hazel Henderson, internationally-known futurist, receives potlatch bowl carved by North Coast native artist Randy Adams (left), of Prince Rupert.

B.C. Hydro is in tune with a growing world-wide shift towards the creation of a new conserver society, according to futurist Hazel Henderson.

In her keynote address to over 200 delegates attending the 3rd annual Electric Energy Forum in Prince George, May 6 to 8, Henderson praised Hydro's willingness to listen to people. She cited Power Smart and Resource Smart as examples of forward-looking programs.

The three top energy issues of the 1990s, Henderson said, will be conservation, alternative energy sources, and lifestyle changes including recycling and use of passive energy.

To achieve these goals, she said, will require long-term commitment by governments and corporations as well as wide debate in the mass media.

The debate in B.C. over development of new energy resources, Henderson added, is part of an "agonizing reassessment of all the issues, policies and values" of an industrial society epitomized by the economic development of the 1980s.

The speaker predicted the next decade will see a fundamental shift in the focus of global issues from North-South to East-West. Already, she said, it is Third World countries that are leading the search for new ways of measuring development and prosperity.

The Gross National Product (GNP) is no longer an acceptable yardstick, Henderson added. "There is widespread confusion over the difference between money and true wealth. Just consider, the GNP of the State of Alaska actually went up as the result of the Valdez oil spill."

To try to use the GNP to guide economic development in the years ahead, Henderson said, is like "flying a Boeing 747 with only an oil pressure gauge in the cockpit."

A new yardstick for acceptable development must include many non-money factors. Henderson cited inclusion of education standards, health care, environmental policies, and pollution.

She said in her home State of Florida they are now using quality of life comparisons instead of tax giveaways to attract new industry.

"ISSUES" FOCUSES ON ENERGY FORUM

The third annual Electric Energy Forum is the topic for the inaugural edition of *Issues*. This newsletter will be published from time to time by Corporate Communications to give all Hydro employees detailed coverage of special events and corporate issues.

The Energy Forum is a key event in our public involvement process. Inside *Issues* look for:

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2 We must adapt to save the environment
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4 More than price shock needed
7 Stronger values from 1990 Forum

BC hydro
July 1990

Efficiency alone is not enough

The 1990s are the "turnaround decade" when B.C. must get on the road to an economy based on sustainable development, a former University of B.C. professor told Energy Forum delegates.

Irving Fox, professor emeritus of community and regional planning, said Hydro has an "ethical responsibility not to foster economic growth at the expense of our quality of life."

Hydro is doing a "terrific job" of promoting Power Smart, Resource Smart, and public dialogue throughout the province, Fox said.

"This alone isn't enough," he added. "Not fostering growth at the expense of sustainable development means building no new dams or thermal power projects during this decade. It means meeting our power needs through the addition of generators at existing power projects. It means extending Power Smart and encouraging use of decentralized wind and solar energy sources."

Fox, who moved to Smithers after living in Vancouver for many years, told the Forum audience he is very concerned about development in the Lower Mainland. "The direction being taken I fear is in the direction of (creating another) Los Angeles."

Change to a lifestyle more compatible with sustainable development, Fox said, is bound to affect electricity use in the province. "Major change in real terms must come at least partly from a reduction in industry," he added. "The Gross Domestic Product (GDP) will be reduced. Communities will become more important and power needs will be reduced."

Fox called for an expanded role for local and regional institutions to promote what he described as "the community welfare." He said living in a small northern community has convinced him this premise is correct.

"Efficiency alone isn't enough," Fox said. "We all pay lip service to sustainable development provided it isn't allowed to compromise the capitalist lifestyle and growth ethic."

Former UBC professor Irving Fox (left) and Dr. John Foster, president of the World Energy Council.

Communities throughout the province should be helped to provide environmentally benign jobs to replace those lost in pulp and paper mills. "This will be expensive but it will save us the $3.5 billion costs of developing Site C and avoid a divisive political battle in the process." Fox said.

He urged Hydro to continue to hold public meetings throughout the province to inform, educate and elicit the widest possible response. Fox said the people should be offered choices not, any specific plans.

We must adapt to save the environment

The president of the World Energy Council warned we must begin the long process of adapting to more environmentally benign energy resources.

Dr. John Foster, who addressed the Energy Forum on patterns of world energy use, said Canada is fortunate because "we can have all the energy we need in the future.

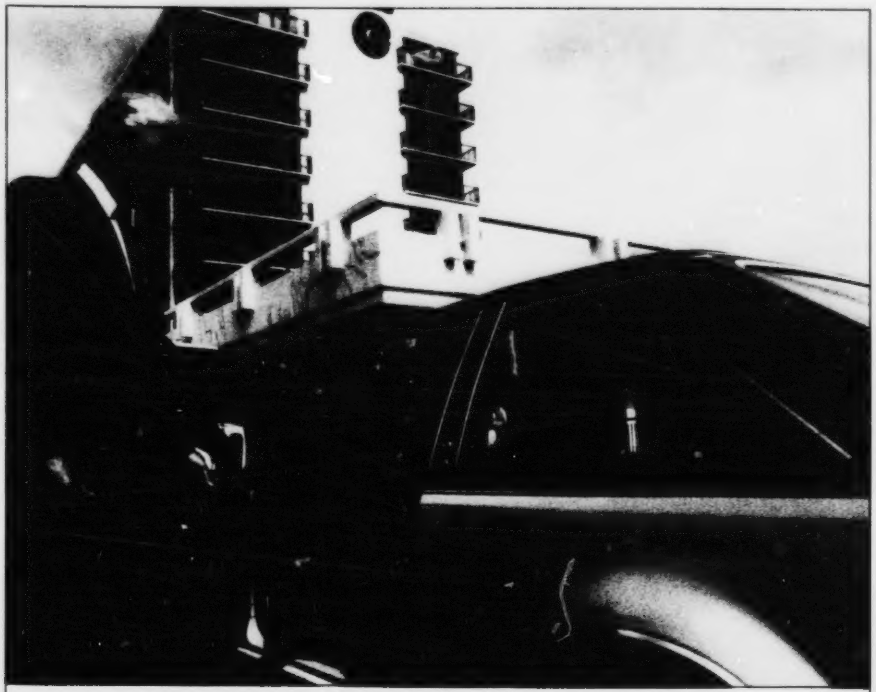
"We have lots of undeveloped hydro potential. There's still lots of mileage in our fossil fuels, gas in the far north, and we have our tar and oil sands.

"But power generation changes our environment. Canada's hydro dams ruin farmlands through flooding. India has lost its forests to gatherers of firewood. In Africa the loss of trees has created deserts. The trick is to produce energy and preserve the environment."

This country must learn to use our abundant energy sources in environmentally-friendly ways. Dr. Foster told the forum audience: "It's going to take us decades to learn to adapt... it's a long slow process."

New directors introduced

At the 1990 Energy Forum, David Lane, of Terrace (left), and John Whitmer (right) of Prince George, were welcomed by Chairman Larry Bell to the board of directors of B.C. Hydro.



Chairman Larry Bell took the wheel of experimental electric car on display at the forum. Vancouver Electrical Vehicle Association's Doug Turland is at left.

"Beware of technical fixes"

Sustainable development was the topic of the first afternoon speaker at the 3rd Energy Forum. Tim McDaniels, economist and professor of environmental studies at Western Washington University, reminded participants there are "no rights or wrongs or experts" on sustainable development.

Tim McDaniels

McDaniels said unfortunately sustainable development isn't a blueprint for success. He warned the audience to "beware of technical fixes. There is no prescription on what to do and we can't escape trade-offs between environmental capital and economic capital."

Success will depend upon being able to distinguish between facts "on which everyone should agree" and values "which can be diverse," the speaker said.

B.C. Hydro and Bonneville Power Administration are both "asking the right hierarchy of questions" when they consult the public.

Both utilities ask first "what kind of province or state do we want?" Only then do they consider how much power is needed, how to use it, and the best sources of supply.

Meanwhile, McDaniels said, all the writing and thinking on sustainable development can't help but have a positive effect. He added: "We need informed values. We need to be aware of current information and uncertainties. We need to use logic and set priorities.

"We need to pay attention to debate (about sustainable development) in the media. But along with that we must exercise our own good judgement on public opinion."

A fundamental shift seen to ethical issues

B.C. is experiencing a fundamental shift in social values towards a new moral imperative, the province's Deputy Minister of the Environment told the Energy Forum.

Richard Dalon

Richard Dalon, speaking at a forum luncheon, said the public has shown it will no longer countenance environmental degradation. This poses a new dilemma as government attempts to come to terms with the ethical issue of how to promote sustainable development.

For Hydro, Dalon said, this means electricity demands must be weighed against competing demands on water resources to sustain fish, wildlife, and tourism.

He added: "This new dilemma is forcing us to re-examine our lifestyles. Power Smart is already saving enough electricity to supply 5,000 homes. But there is more to be done to meet the demands of the future. We must recognize our personal decisions affect the environment."

Dalon said the government is working on a sustainable development strategy which will set the stage for change. Due out soon is what he called the action plan for Environment 2001. Among proposals under consideration, he said, is a "disposal levy" on every new tire or lead acid battery sold. The levy would be more important as a reminder of conservation than as a source of revenue.

The revenues would go into a sustainable development fund to encourage people to recycle or properly dispose of hard-to-manage products.

Forum delegates toured Northwood pulp mill, on northern outskirts of Prince George, to see how co-generation disposes of waste while meeting 85% of the mill's energy.

Role of native people spelled out

Native peoples have a role to play in the future development of British Columbia's resources, the 3rd Energy Forum was told.

Ed John, former chief of the Carrier Sekani Tribal Council, said native people worry about a future in what he called "a post-industrial wasteland." He said they are fighting to share in control over the so-called environmental agenda for this province.

He told the forum audience the ancestors of native people left no monuments like dams and reservoirs. "They were visitors here and they believed they should act like visitors on this earth. When they died they left only their memories.

"They believed this earth is like our mother, to be treated with respect and dignity."

It's difficult for most British Columbians to appreciate, John said, that native people have "a long way to go just to catch up with you in comforts. Most of our communities have no power, no piped water, and unemployment is often between 80 - 90 per cent."

John drew a round of applause when he said it might help our understanding if the 1991 Energy Forum was held in a remote native community which has no electricity.

He noted the World Commission on the Environment and Development, in its report entitled "Our Common Future", referred to indigenous peoples as a "touchstone of modern development."

Ed John, former chief of the Carrier Sekani Tribal

The speaker said some of B.C. Hydro's initiatives are "very commendable." But he emphasized the views of all people in society must be considered. "The global context (set out in the Brundtland report) must be reviewed in the context of the nation state."

John added: "We feel we have something positive to contribute and that a just and equitable solution rests in the hands of ourselves and those of the government. The power to deal with the earth is in our collective hands."

More than price shock needed for conservation

The deep recession in the early 1980s convinced Bonneville Power Administration that market forces alone aren't enough to encourage conservation of electricity.

John Elizalde, BPA chief of residential conservation programs for 10 years, said he is convinced "conservation is the answer—but it ain't cheap and it ain't easy."

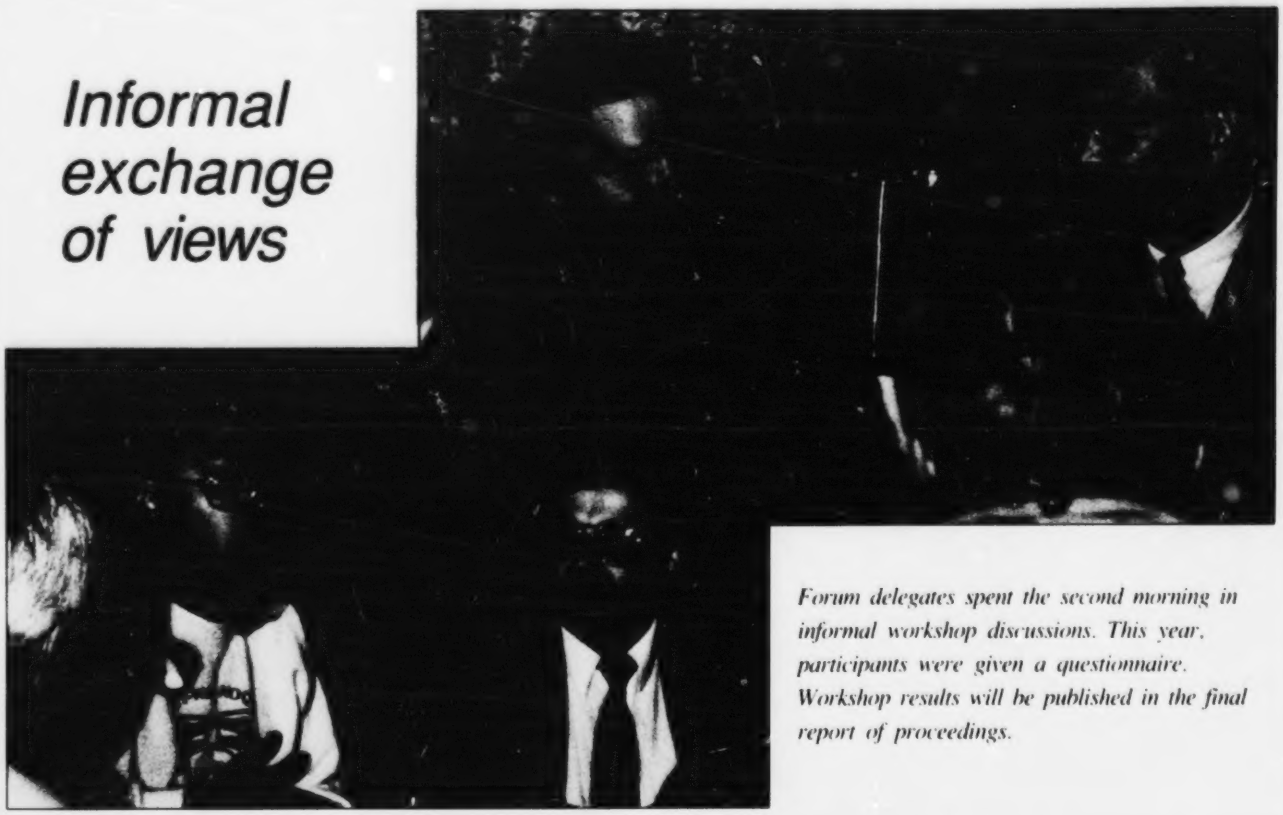
John Elizalde

B.C. Hydro and BPA are connected both electrically and hydrologically and also share common policies including a belief in conservation of electricity. The speaker said: "We're out in front. But like the bow of an ice breaker we get all beat up in the process."

When the last recession hit Washington state BPA had to mothball two nuclear power plants and bring a third on line—while paying for all three. As a result, Elizalde said, power rates doubled. But he noted that "only two years later this significant price shock was almost forgotten" and electricity use once more began to rise.

Elizalde said he found conservation in the commercial sector the "most perplexing." While it is always difficult to quantify savings, he suggested results from conservation can be maximized "by being there at the right time." This means, he added, when commercial premises are being sold, renovated, or occupied by new tenants. The industrial sector offers the most promise for future gains.

Informal exchange of views



Forum delegates spent the second morning in informal workshop discussions. This year, participants were given a questionnaire. Workshop results will be published in the final report of proceedings.

Electricity prices lower for northern industry?

Jack Davis, Minister of Energy, Mines and Petroleum Resources, told Energy Forum delegates that although B.C. Hydro has given up its electricity monopoly it will remain "the big boy on the block."

In a luncheon address to forum participants on the final day, Davis said Hydro's position is secure "as the big utility which will serve the core market and the little people for a long time to come."

With the creation of Independent Power Producers (IPPs), the minister said, Hydro was no longer the only game in town. But, Davis added, "the entity that controls the major grid is going to remain the big boy on the block."

The minister said government policy allows IPPs to generate their own power, put up their own dams, co-generate, and sell firm power to industries nearby or far away. Hydro will "wheel" this power over its grid for a fee but provide no subsidy.

This will create a two-price policy, said Davis. Hydro will continue to charge its "postage stamp price" and IPPs can take advantage of lower generation costs in certain regions to provide cheaper electricity at firm prices over a long term.

"This is good news in the North where low cost gas and unique hydro sites developed by private power producers could act as a magnet for new industry," Davis said.

The largest single resource available is demand management, the minister said. Conservation can produce savings equivalent to the output of Site C at half or less of the price of building the new power project. In addition, a single private co-generation project serving Williams Lake will provide half the power of Site C at less cost.

"We have the resources to go on for quite some years in the future without putting a major dam on a major river," Davis said. "We know this power will cost less than a big dam and transmission lines. So we know electricity will continue to be a bargain...which creates a problem on the marketing side as we try to encourage conservation."

That's why the government decreed that Hydro should pay a return on equity into government coffers which will be used to pay for hospitals, schools and other social services.

Energy audits in Northern region identify big savings

The Inn of the North, where the 3rd Energy Forum was held May 6 to 8, is one of three commercial buildings in Prince George where energy audits have been carried out by B.C. Hydro.

Rob Kikkert, marketing manager for Hydro's northern region, told forum participants that a walk-through audit quickly identified energy savings of $18,000 a year. These initial savings were mainly achieved by replacing light bulbs with compact fluorescents.

Rob Kikkert

The regional staff has completed three walk-through audits in commercial buildings in the city. Kikkert said savings of 14 to 27% of annual energy costs were immediately identified mainly in lighting.

The speaker said Hydro has contacted 36 municipalities and regional districts in the north and offered to conduct walk-through audits. Kikkert said six have accepted so far and potential savings as high as 60% have been identified. The average saving was 25%, again mainly in lighting.

Kikkert said to date there have been no completed industrial audits. Staff have tested six compressor units and found leakage amounting to 600 horsepower. He added the energy saved by correcting these defects could supply electricity to 555 new homes.

Meanwhile energy audits are being carried out in all Hydro buildings. Kikkert said the aim is to make them as energy efficient as possible "to demonstrate to customers our commitment to energy management."

Hydro switching to two-year planning

B.C. Hydro is switching to a two-year planning cycle in its ongoing assessment of the province's electricity needs, the Energy Forum was told.

Ken Peterson, director of planning and head of Hydro's resource planning committee, said "the two-year shelf life on current plans will mean that in 1992 Hydro will focus in depth on long-range issues and getting public feedback."

He told the audience Hydro is always looking for effective mechanisms for public feedback. Participants were urged to complete the questionnaires distributed at the forum as part of this process.

Hydro's public involvement programs are not intended to create a lever to drive lifestyle changes, Peterson said. He suggested lifestyle is becoming an overworked term. "We are dealing with the derived demand for electricity. Nobody needs kilowatt hours. We all need comfort and heat. Our choices are driven by habit, marketing and price."

Nevertheless, Peterson said, "I agree we must get the choices out there to encourage debate. There are some tough trade-offs to be made. It is Hydro's role to elucidate (the issues) as well as we can before those choices must be made."

Reviewing progress in conservation and load displacement, Peterson said "cogeneration and cooperative development with the forest industry is very encouraging. It could help us get through the 1990s with no new hydro developments at all."

He dismissed arguments that undersupply was the best way to enforce conservation. "This is not the prevailing view of the government or work seekers," Peterson said.

Prince George hails audit program

The city of Prince George is among the first to take advantage of B.C. Hydro's energy audit program, said Mayor John Backhouse.

The mayor welcomed the more than 200 participants to the 3rd Energy Forum held at the Inn of the North. Backhouse thanked Hydro for the opportunity to examine all aspects of the city's energy use.

He predicted a bright future for Prince George and said he believes the key to success lies in the "effective and efficient use of electrical energy."

In his opening remarks, Chairman Larry Bell also noted his former hometown is now B.C.'s "second largest city and third largest metropolitan area."

Referring to a windstorm that left 15,000 Prince George customers without power as the forum opened, Bell said demand is an abstraction until your lights don't work.

"Electricity is an integral part of our lives," Bell said. "When you don't have it, you can really see its value. So we need to be careful when we talk about (electrical) demand and risk associated with demand."

Prince George Mayor John Backhouse

Panelists Laurie Gray, left above, Walter Hardwick. At right, Steve Head, Jamie Alley.

Stronger shared values from 1990 Energy Forum

By the end of the 3rd annual Energy Forum, there was a consensus among the more than 200 participants that it had succeeded in building new and stronger shared values on electricity supply in B.C.

Speaker after speaker praised Hydro for it's efforts to involve the public in decision-making. Two panel discussions, which included written questions from the floor, confirmed the upbeat tone of the proceedings.

Panelist John Elizalde, from Bonneville Power Administration, said he found the forum impressive and added it seemed to signal "the beginning of a new relationship, a new way of doing business with the public."

"We all need to recognize B.C. Hydro is an anomaly in the electric utility business," Elizalde told the forum audience. "This ain't normal, you ought to appreciate that, folks. It doesn't have to be this way."

Other panel members taking part in the wind-up session added their own words of praise.

Steve Head, president of the 40,000-member B.C. Wildlife Federation, said the forum showed Hydro "was on a roll. You have presented yourself as a leader in B.C. in seeking positive and concrete solutions to the energy problem."

Jamie Alley, director of Sustainable Development and Corporate Policy, B.C. Environment Department, said: "We need to build consensus with the right processes. We all need to take responsibility for our own actions. I want to thank Hydro for starting this process..."

Laurie Gray, an environmental engineer with CanFor, said he felt he had been exposed to a wide range of views which would help him to make decisions in future. The forum is helping to change social values, Gray said, and he noted "society has a very positive influence on industry decisions."

Walter Hardwick, UBC professor of geography, said people have lost confidence in politicians, experts and institutions. There has been a corresponding increase in the belief that "the citizens are oracles." Hardwick said he was concerned about a lack of public information for decision making.

continued on page 8

Employee awareness encouraged

B.C. Hydro wants to encourage more environmental awareness and interest among it's employees, the Energy Forum was told.

Zig Hathorn, manager of environmental resources, told the participants "in the final analysis it is people who will make this thing work. Our employees and those who work in the environment should enhance their understanding of environmental issues.

Zig Hathorn

"It's all very well to say, thou shalt not," Hathorn said. "But it's better to know why. We all need to find ways to improve our environmental performance."

The speaker said the campaign involves two-way communication. He added: "As far as the public is concerned, we want to hear what their expectations of us are."

Both employees and public should understand, Hathorn said, that to minimize impacts on the environment Hydro will strive to replace lost resources in kind. "This is a very important principle. If we are to be judged it should be by an informed public."

He cited as an example the establishment of a $10,000 fund for long-term rehabilitation of a fishery in Williston reservoir. Hydro is looking at similar projects to see whether this kind of project could be initiated.

"Find the hooks to bring us together"

from page 7

He said Hydro is helping to show that government and corporations aren't afraid to act and this builds public confidence. Hardwick urged Hydro to continue to "find the hooks to bring us together. People are frustrated and worn out. The majority are prepared to act but they need examples of what actions are possible."

An earlier panel dealt with "Present Lifestyles and Electricity Use".

Futurist and forum keynote speaker Hazel Henderson said all Hydro stakeholders should get together and try to envision what their community or region will look like in the year 2000 or 2110. To complete this loop, she said, people must see their ideas are listened to with goodwill.

Henderson added: "Canada, with it's enormous resource-base and small well-educated population, could create a climate to elicit creativity from all of its citizens. (To achieve this) we must design complex feedback systems including those from Mother Nature."

Ed John, former chief of the Carrier Sekani Tribal Council, said he agreed "people must be involved in a real way. Their ideas must be listened to seriously."

John said this would be a good first step towards resolving B.C.'s aboriginal land question in a fair and equitable way. He added: "This is not a land grab. We feel our people must have real involvement in the process of resource management."

Irving Fox, professor emeritus of community and regional planning from UBC, now a resident of Smithers, said we must look to local and regional groups to create changes in B.C. lifestyle. In effect, Fox said, "we need them to take over some controls presently in the hands of industry and government."

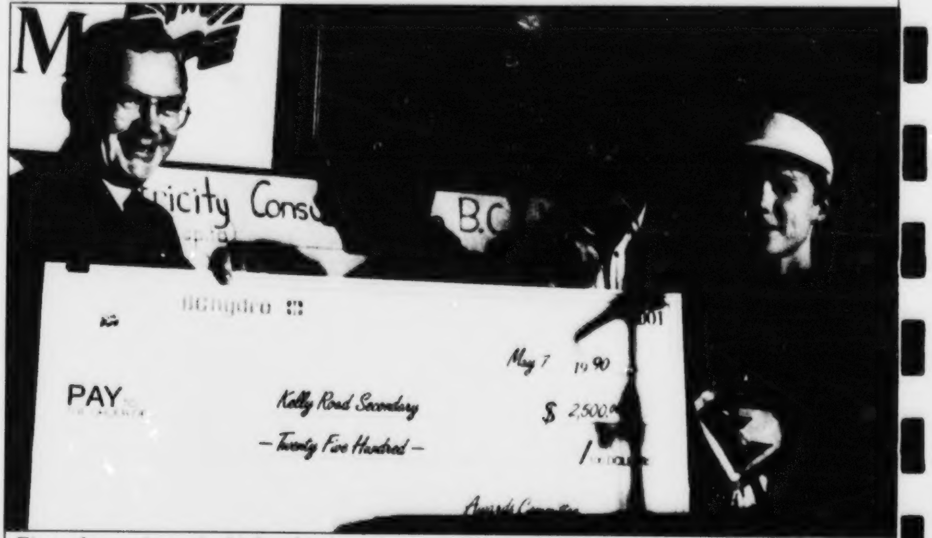
Chairman Larry Bell, in his closing remarks, thanked all forum participants for their ideas and observations. Bell said: "Your strongly held views, exchanged with civility, helps to build the shared values we have seen here over the past two days. I'm delighted."

The chairman said the public involvement process within the forum has given Hydro new impetus. "I find myself with more shared values, more unanimity, than I've found in my job over the past three years."

1991 Energy Forum set for Victoria

Chris Boatman, vice-president of Corporate and Environmental Affairs, announced the 4th Energy Forum will be held in Victoria next April 16 to 18.

He invited participants in the Prince George forum to attend the 1991 event. "These events represent a very important challenge for all of us," Boatman said. "We hope you'll all come."



First place winner in high school science project, sponsored by Hydro as part of the Electric Energy Forum, was Kelly Road Secondary, Prince George. Larry Bell presents $2,500 prize to teacher Jim Stinson and "Mr. Energy", student Trevor Gustafson.

Issues

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BC hydro

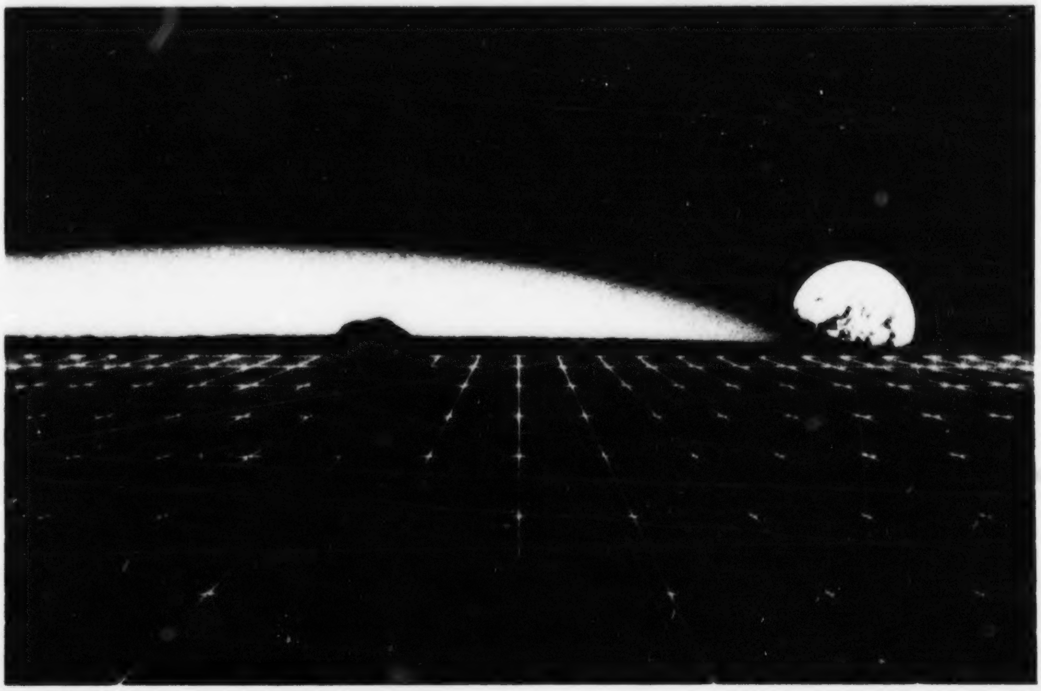
ISSN 1181-6430

Recycled Paper

Year 2020

Lifestyles and Energy: High School Science Competition

The future of energy use in British Columbia



sponsored in association with

the Third Annual Electric Energy Forum

Ministry of Environment

BC hydro

Ministry of Energy,
Mines and Petroleum Resources

This pamphlet acknowledges the award winners in the High School Science Competition; sponsored by B.C.Hydro, the Ministry of Environment and the Ministry of Energy, Mines and Petroleum Resources, in association with the Third Annual Electric Energy Forum, May 6 to 8, 1990, in Prince George.

Students in Grades 8 to 12 at twelve schools in the Prince George, Valemount, McBride and Mackenzie areas were invited to create science projects illustrating their views about the future of energy use in B.C. in relation to the lifestyles they foresee in the year 2020.

The students made their presentations to a panel of judges on Thursday, April 19, at the Coast Inn of the North in Prince George.

The judges were BCTV weatherman Norm Grohmann, Jane Ramin of the Ministry of Energy, Mines and Petroleum Resources, Blake Medlar of the Ministry of Environment, Conrad Guelke of B.C.Hydro, Harry Hufty, Principal of King George V Elementary School in Prince George and Mike Benny of Radio CKPG.

The first-place team, from Kelly Road Secondary, will repeat its winning presentation to the audience of the Electric Energy Forum on the afternoon of May 7.

Winning teams have been awarded cash prizes to be used to fund school projects, activities, or purchase equipment. This pamphlet acknowledges the winners and awards.

First Place $2,500

Kelly Road Secondary

Grade 9

Students

Stephanie Burleigh,
Tanya Dunne,
Sandy Gillette,
Trevor Gustafson,
Anna Lentz,
Kirsty McWalter,
Allison Nicoll,
Sara Stevens,
Rebecca Stiles,
Chelsea Szanik,
Megan Szanik,
Cindy Trottier,
Naryn Watt,
Jason Vrastak.

Sponsoring Teachers

Mr. Stinson/Ms. Ibbotson

Star traveller Captain Energy sets down in B.C. to re-energize his spaceship, only to find energy expensive and in short supply in the year 2020. He explores with us, back through time, the repercussions of the lifestyles and conservation ethics of various families.

Back in 1990 Captain Energy discusses facts about resources and the environment with a Hydro "dude". He finds that a typical family has a rather good energy ethic — not perfect, mind — so he travels further back.

In the booming sixties, our traveller finds some traces of unnecessary waste and poor attitudes; concluding that the energy crisis began here, if not earlier. (Isn't it just like teenagers to blame their parents' generation?)

In the finale, the entire cast reminds us of the value of energy and its effect on our lifestyles. The cast exits, and the last words in the script are "lights off".

This ambitious presentation includes a large cast, an innovative treatment on staging and in-depth research for the script. It indulges us in a personal as well as scientific quest through energetic acting and humour. Our alien traveller, for example, is rather human, more prone to collisions than landings, very curious and desperately seeking energy.

The cast takes us back in time to explore the origins of today's progressive energy ethic — and wasteful attitudes.

Second Place $1,200

John McInnis Junior Secondary

Grade 9

Students

Brett Bird, Stephen Cyr, Kevin Dergez, Jason Garvock, Mike Maki, Howard Nelson, Matthew Olah.

Sponsoring Teacher

Ms. Noukas

It's "Holovision 360". News, weather and sports from Prince George, now the metropolitan centre of B.C. We are zipped by this Grade 9 cast and crew through a multi-media production that explores lifestyles and energy in 2020.

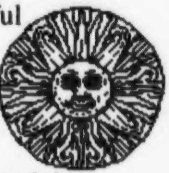
Numerous reports tell of delicate energy supplies and environmental issues, complete with on-the-spot videos of a sometimes frightening view ahead.

B.C. in 2020 is not without its myths. Elvis Presley has held three performances in different places — all at the same time. A dangerous convict has escaped: up comes a picture of George Burns (maybe he went to prison for smoking a cigar).

The fast lane of sports is a roster of progeny from familiar names and global achievements here at home. And now the weather.

The weatherman is all over the map with instantaneous satellite feed-in through his bionic right arm, a mass of buttons and electrical wires. A big helmet/parasol protects him against outdoor sun spots and indoor studio spots (energy wasteful lighting).

Among the judges is "Norm Grohmann" — fair weather friend and media celebrity with his own hits and myths. He is squirming, studying the natural beauty of his own right arm.



Third Place $600

John McInnis Junior Secondary

Grade 9

Students

Cheryl Bateman,
Kristy Cairns,
Linda-Anne Greenaway,
Meg Miners,
Tracy Orthner,
Carla Van der Woude,
Debbie Van Tol,
Mandy Young.

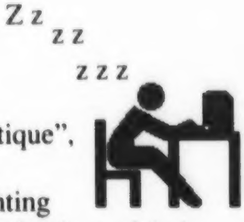
Sponsoring Teacher

Ms. Noukas

Poor student. Her science report on the environment is overdue. Exhausted, she falls asleep among her classmates, only to awaken 30 years hence as Rip Vanna Winkle while her girlfriends are delivering their reports.

The good news about classrooms of 2020 is that there is no teacher physically present to hound students about deadlines and attitudes. The bad news is that a central computer is in charge — hungry for all kinds of information.

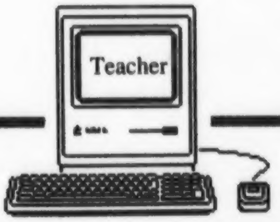
We learn of lifestyles and energy in 2020 through the students' reports and interaction. Fashion tells us a lot too. The young ladies are robed in super-insulating silver fabric. Jewelry of the day is best described as "electric-antique", recycled fragments and filaments of by-gone lighting appliances from the wasteful days of their parents' generation.



The reports tell of the most planet-friendly and cost-effective energy sources of 2020, as well as how the typical home and office lifestyles have advanced.

Vanna and her classmates conclude that all sectors of the province have made great strides in energy efficiency and environmental conservation. The teacher-computer agrees.

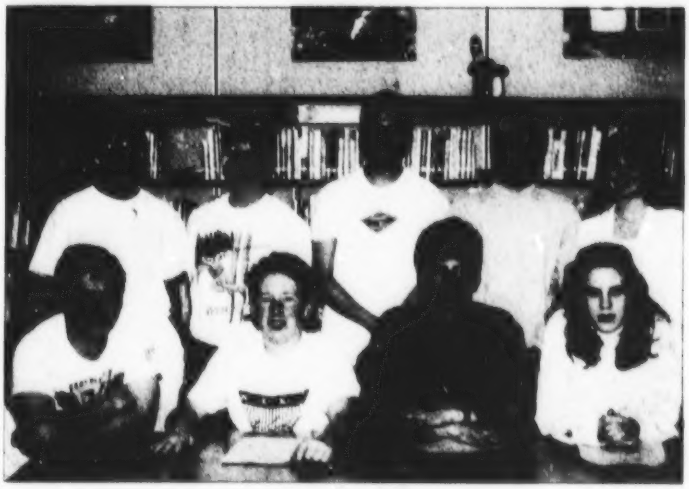
Vanna returns to the present and wakes, realizing what she and everyone can do to make her dream come true.



Honorable Mention

John McInnis Junior Secondary

Grade 10

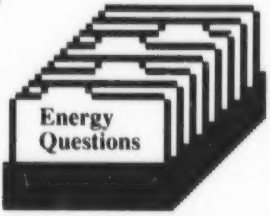


Students

David Barr, Kevin Blotham, Emily Gable, Brad Morrison, Joey Skavlebo, Gord Stewart, Christa Thomas, Marcie Tomlinson, Chinh Vo.

Sponsoring Teacher

Ms. Noukas



We are in jeopardy in 2020. Energy is on everybody's mind. Developments, inventors, lifestyles and electricity. The issues rack up on a huge bank of monitors as our three contestants and our host appears.

Applause. You guessed it. This is Jeopardy 2020 with Gord Trebek, that young Canadian genius who knows what is everything about anything? (Remember to pose it as a question.)

This cast of nine Grade 10 students treats us to the excitement of game shows of the future, as well as the questions on peoples' minds about lifestyles and electricity. The facts — ranging back to the nineteenth century — reveal all the research put into this presentation.

The show is complete with commercials, a view of modern products and applications of electricity. One demonstrates basketball players with Nike Hover shoes, charged with electricity for "hovering" up to the basket. The prizes illustrate trips on an exotic cruise liner and a "bullet" train.

And the winner at final jeopardy? Who is Ms. Hydra Lines, and what is by one dollar?

Honorable Mention

Prince George Senior Secondary

Grade 12

Students

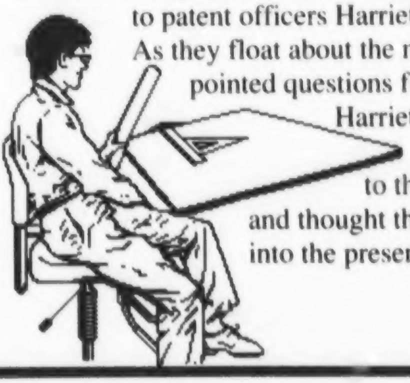
Catherine Clarke, Erik Jancicka, Marc Law, Thanh Vu.

Sponsoring Teacher

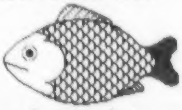
Mr. Byrne

Hydroelectricity will play an important role in B.C.' energy supply in the future, according to the presentation by these Grade 12 students. So will the environment. The theme is an environmentally friendly generating system.

We look in on a patent office with a large model of a "damless" hydroelectric facility. Doctor Harold and his assistant, Doctor Felicity, present their technical case to patent officers Harriet and Saul. As they float about the model, pointed questions from Harriet and Saul expose us to the research and thought that went into the presentation.



Doctor Felicity saves the day for her grey-haired but flirtatious colleague, for the humor and excellent acting shine through when we soon realize that Doctor Harold has 20-20 vision only for the attractive Harriet. "Ah, my dear Harriet," he begins. "You wonder what will happen to all the little fishies in the mountain stream. I can picture you and the mountain and all the little fishies . . ." Then he drifts into a romantic vision of Harriet and himself atop the mountain in the model — without a dam, or anything else to do with the patent.



It is nice to believe that in 2020 there still will be romance . . . in hydroelectricity.

We would like to acknowledge the schools, school district, teachers, their students and the people behind the scenes for their first-class efforts and participation in this event.

BC hydro

Ministry of Environment

Ministry of Energy,
Mines and Petroleum Resources

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THIRD ANNUAL

ELECTRIC ENERGY

FORUM

Lifestyles, the Environment and Electricity Use

LIST OF ATTENDEES

1990 ENERGY FORUM REGISTRANTS

NAME	TITLE	AFFILIATION
Dave Abbott	Studies Consultant	Ontario Hydro
Om P. Acharya	Distibution Engineer	B.C. Hydro
Marian Adair	Vice-President	Norecol Environ. Consult. Ltd.
Paul Adams	Production Manager Northern Region	B.C. Hydro
Mary Algar	Community Relations Coordinator	B.C. Hydro
Russ Allen	Technical Sales	Klohn-Crippen Consultants
Jamie Alley	Dir, Sustainable Develop. & Corp.	Ministry of Environment
John Backhouse	Mayor	City of Prince George
Don Bacon		TransAlta Utilities
Beverly Baker		Tondu Energy Systems
Robert Ballantyne		Ballantyne & Associates
Gary Bannerman	President	Bannerline Enterprises Ltd.
Jeff Barker	Project Manager	B.C. Hydro
Warren Bell		Energy Mines & Petrol.Resources
Larry Bell	Chairman & C.E.O.	B.C. Hydro
Bill Best	Consultant	
Kamal Bhattacharyya	Head, Emissions Evaluation	Ministry of the Environment
Heidi Biberhofer	Project Engineer	Crippen Consultants
Keith Billington	Band Manager	Fort Ware Indian Band
Bruce Bingham		Meager Creek Historical Society
R. A. Birnie	Production Maintenance Tech.	B.C. Hydro
Chris Boatman	V-P, Corp. Affairs/Environment	B.C. Hydro
Bryan Bodell	Industry Liaison Coordinator	B.C. Hydro
Mayor Les Braaten	Mayor	District of Hudson's Hope
Bob Bradley	Senior Wildlife Biologist	B.C. Hydro
Barry Burko	Environmental Analyst	
R. J. Burns	Director of Physical Plant	Vancouver General Hospital
Peter Calder	Project Manager	B.C. Hydro
Jim Campbell	Inspector	
Frank J. Capello	Mgr Cust.Services, L.Mainland	B.C. Hydro
Tom Carlson	President	Biosonics Inc.
Phillip Carter		Energy Mines & Petrol.Resources
Laura Chanin	Public Consultation Officer	B.C. Hydro
J.D. Chapman		UBC Dept. of Geography
Ichu Cheng	Policy & Planning Engineer	B.C. Hydro
Bill Chernenkoff	Safety & Health Coord.	B.C. Hydro
Suzanne Christensen	Researcher	New Democratic Party Caucus
Charles Clark		Bonneville Power Admin.
Penny Cochrane	Westech Client Services	B.C. Hydro
Wayne Cousins	Communications Planning	B.C. Hydro
Wally Craig	Manager, Regional Marketing	B.C. Hydro
Karl Cremer	Electric Vehicle Association	White Rock, B.C.
Jack Cridland	Westinghouse Canada Inc.	Vancouver, B.C.
Bob Crockett	Marketing Manager	B.C. Hydro

NAME	TITLE	AFFILIATION
Tony Curzon		Portage Mountain Yacht Club
Sally Dabb	Recycling & Environ. Action Soc.	Prince George, B.C.
Laverne Dalgleish	Secretary-Treasurer	National Energy Conserv. Assn.
Richard Dalon	Deputy Minister	Ministry of Environment
Ruth Ann Darnall	Peace Valley Environ. Assoc.	Fort St. John, B.C.
Hon. Jack Davis	Minister	Energy Mines & Petrol.Resources
Victor De Buen	Manager, Resource Planning	B.C. Hydro
Robert Diffely		Bonneville Power Admin.
Bill Dinsmore	Manager, Environmental Sciences	B.C. Hydro
Linda Dong		Northwood Pulp & Timber
Steve Dotto	Upper Case Technology	Richmond, B.C
John Drinnan	Communications Planning	B.C. Hydro
Bob Duff		Energy Mines Resources Canada
Jack Edwards	External Relations Manager	B.C. Hydro
Anne Edwards	MLA, Kootenay	NDP Environ. Spokesperson
Terry Einarson	Regional Division Manager	B.C. Hydro
John Elizalde	Chief, Residential Programs	Bonneville Power Admin.
Ken Epp	Mgr, System Operation & Mtce.	B.C. Hydro
Don C. Fairburn		N.W. Energy Corp.
George Favre	President	Fraser Canyon Power
Sonja Filipovic		Business/Prof. Womens' Club
Owen Fleming	Environmental Resources	B.C. Hydro
John Forsdick	Senior Consultant	Perk Consulting
Dr. John Foster	President	World Energy Council
Dr. Irving Fox	Professor Emeritus	Smithers, B.C.
Ella Fraser		Opportunities North
Martin Friesen	Graduate Engineer Trainee	B.C. Hydro
Arthur Geikie	V-P, Energy Innovation	B.C. Hydro
Al Geissler	Community Relations Coordinator	B.C. Hydro
Lloyd Gething		Hudson's Hope Historical Soc.
Josefina Gonzales	Nat.Roundtable Environ. & Economy	Forintek Canada Corp.
Douglas N. Gook	Dir, Cariboo Horse Loggers Assn.	Quesnel, B.C.
Douglas Gordon		Ministry of Environment
Jim Gothard	Production Superintendant	B.C. Hydro
Kevin Graeme	Project Public Consult. Officer	B.C. Hydro
Laurie Gray	Energy & Environ. Engineer	Canfor Corp.
Michael B. Green	B.C. Trappers Association	Prince George, B.C.
Harold Gruber	External Relations Consultant	B.C. Hydro
Conrad Guelke	Manager, Communications Planning	B.C. Hydro
John Gullion		Wirtanen Electric.
Gary Gustafson	District General Manager	Federal Business Devel. Bank
Mike Gwilliam	Project Manager	B.C. Hydro
Jack Habart	Manager, Planning & Evaluation	B.C. Hydro
Larry Haffner	Manager, Peace Production Area	B.C. Hydro

NAME	TITLE	AFFILIATION
John Hague	Commissioner	B.C. Utilities Commission
Dr. Walter Hardwick	Professor	UBC Geography Department
Connie Harris		Shuswap Environ. Action Comm.
Zig Hathorn	Manager, Environmental Resources	B.C. Hydro
Bill Haviland		
Steve Head	President	B.C. Wildlife Federation
Tony Hechenburger	Regional President	B.C. Wildlife Federation
Dr. Hazel Henderson	Futurist (Keynote Speaker)	St. Augustine, Florida
Derek Henriques	Manager, Energy Management	B.C. Hydro
Robert E. Henriques	Washington Water Power Co.	Spokane, WA
Wendy Herbert	Principal	D.P. Todd Secondary School
Vic Hope		Peace-Liard Wildlife Society
Doug Horswill	Deputy Minister	Energy Mines & Petrol.Resources
Ray Hunt	V-P, System Development	B.C. Hydro
Ken Hunter		
Rod Hyslop	Communications Planning	B.C. Hydro
Gwen Johannsen	Peace Valley Environmental Assn.	Fort St. John, B.C.
Ed John	Carrier Sekani Tribal Council	Prince George, B.C.
Bob Johnson		Canadian Biosonics Ltd.
Veikko Kammonen	Area Manager	B.C. Hydro
David Keckalo	Commercial & Industrial Sales	B.C. Hydro
Roberta Kelly	Minister's Assistant	Energy Mines & Petrol.Resources
Michael Kennedy		B.C. Telephone Co.
Rob Kikkert	Regional Marketing	B.C. Hydro
George I. Killy	President	Vanderhoof Pulp & Paper
Ben Knutson		Peace River Regional District
Vern Krienke	Manager, Customer Services	B.C. Hydro, Prince George
J. K. Krueger	Tahltan Tribal Council	Dease Lake, B.C.
John Lainton	Manager, Energy Forecasting	Saskatchewan Power Corp.
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THIRD ANNUAL

ELECTRIC ENERGY FORUM

Lifestyles, the Environment and Electricity Use

NEWSPAPER CLIPPINGS

Prince George (B.C.) Citizen

MAY -4. 1990

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ENERGY USES PROBED

If it came to a choice between your hot tub and the environment, which would it be?

B.C. Hydro is asking people to take a look at their priorities at a three-day conference on Lifestyles, the Environment and Our Electricity Use, beginning Sunday in Prince George.

"The time has come to look at our energy future and where it is going to go," said Hydro spokesman Vern Prior in an interview from Vancouver.

"We have got to look at lifestyle choices and what they mean in terms of energy demands."

It will mean tradeoffs, said Prior.

"Maybe you are going to have to make some sacrifices, too," he said.

If people are not willing to modify their consuming lifestyles, increasing generating capacity to meet that demand is going to have an environmental impact. Hydro is going to have to "cut down more trees and build more dams," Prior said.

B.C. Hydro has been trying to postpone construction of the expensive and controversial Site C dam in northeastern B.C., or other similar hydroelectric megaprojects, by encouraging energy conservation.

Prince George (B.C.) Citizen

MAY -7. 1990

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Environment, life benefits stressed

Quality of life and the environment are becoming important factors in measuring the costs and benefits of economic development, says an internationally recognized futurist and environmentalist.

There has been an "underestimation of the costs in human and environmental destruction" and an "overestimation of the benefits," Dr. Hazel Henderson said Sunday to about 200 people attending the opening session of the third annual Electrical Energy Forum in Prince George.

"Traditional economic methods of determining the costs of development overlook many of the options open to humans in satisfying their needs and desires," she said.

"We have to remember that economies are living systems based on human beings interacting with their ecosystems."

She said when all of the social and environmental costs of development are factored in, we find "the environmental solution is the economic solution."

The forum, sponsored by B.C. Hydro, looks at our lifestyles and energy use and their impact on the environment.

It continues through Tuesday at the Coast Inn of the North.

Prince George (B.C.) Citizen
MAY -9 1990

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ENERGY FORUM

Environment to determine Hydro projects

by **ARNOLD OLSON**
Citizen Staff

B.C. Hydro's future power projects will increasingly be guided by environmental concerns because of mounting public pressure, Jack Davis, Energy, Mines and Petroleum Resources Minister, said Tuesday.

One of the many ways to provide more power to legitimate users might be in a price increase, he told people attending the third annual Electric Energy Forum. He stressed that no significant price increases are expected in this decade.

"From the standpoint of conservation, they're (current charges) probably too low," he said.

Throughout his unprepared speech he cited the various ways B.C. Hydro can get more power, without going to the Site C project on Williston Lake.

That project has been opposed by agriculture-based interests because of the prime land further flooding would cover. The provincial government recently announced Site C would not be needed for some years because of Alcan's Kemano Completion Project, which will use more Nechako River water to provide power.

Alcan power, he estimated, would be about two-thirds the cost of the same amount of electricity from Site C.

"We have the scope to be different," Davis said, explaining that B.C. has a number of adequate alternative power sources, from co-generation by industry, to conservation on the home and small business front.

"We're struggling with the term sustained development. There is a limit to the resource," he said.

From a universal outlook, he said, virtually no limits exist for minerals, but water power is limited and increasing public pressure is creating more restrictions on power development.

He said the upper Columbia River is almost fully developed, but rivers such as the Fraser and Liard are untouched or almost so.

Fraser said two to three times the power now supplied can still be obtained.

"We have any amount of wood waste," he said, referring to the type of co-generation planned for Williams Lake, where instead of burning wood waste, it will be used to create electrical power.

He said the Williams Lake power will be at half the cost of what it would be from Site C.

Garbage, Davis said, is an untapped source of power through burning and would eliminate a problem for some communities.

However the current largest single resource is to educate the public to properly use the electrical power it has now.

Davis said the press of the '60s for people to use electrical power in their homes will be reversed in favor of people using natural gas.

"We have abundant resources," whether power comes from co-generation from wood waste burned at pulp and sawmills, if industry contracts for cheap natural gas, or if Hydro upgrades its current facilities to be more efficient, Davis said.

"Electricity in this province is going to continue to be a bargain."

Alaska Highway News
(Fort St. John, B.C.)

MAY 14, 1990

Bell dislikes system of public hearings

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B.C. Hydro chairman Larry Bell says he is not happy with the "adversarial nature" of the public hearing process, such as the one proposed for the Site C dam project.

The comment was made last week at the third annual Electric Energy Forum in Prince George.

"The whole concept is destructive — not constructive — and I think we need to modify the way we do it," he said.

The chairman said he did not disagree with providing funding "that was deemed to be reasonable by the regulatory body involved" for those taking an adversarial stance "to permit the gathering and analysis of information required to reach a decision."

"When the money is subsequently used to fund consultants who attack the respective values of the participants in the process, it is a horrible waste of resources," he said.

Bell stated that he would rather have a reasonable number of choices laid out and the data examined by the involved parties, leading to terms of reference for the public to review and criticize.

This would be followed by a "properly constituted competition" to produce the knowledge that everyone can use "in a collective sense" to reach a decision.

"The adversarial process," he claimed, "does not support the development of shared values."

In addressing the matter of future energy needs, the chairman emphasized the importance of "informed choices and tradeoffs."

"Nothing is for free," he said, "and Hydro is attempting to structure its choices so that individuals are not choosing for someone else at no cost to themselves."

"There have to be some checks and balances in our system where people understand what the choices are and participate in a re-allocation of resources necessitated by those choices."

In the matter of Hydro's attempts to encourage conservation, Bell said the utility is endeavoring "to change the ethic."

There are no constraints on the utility's conservation goals, he said, but "we are limited by our ability to change behavior and the way institutions function."

"We want to succeed on the same scale as values about smoking, drinking and driving and exercise have changed," Bell said.

In his closing comments, Bell reinforced Hydro's mandate "to communicate with the general public, particularly where you have the kind of impact on the population that Hydro does."

The forum was organized by Hydro and co-sponsored by the ministries of Energy and Environment.

Next year's event is slated for Victoria in April.

Interior News (Smithers, B.C.)

MAY 23 1990

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A new economy needed for B.C.

A different type of economy must be fostered if British Columbia is to avoid hydro-electric mega-projects that flood valleys and destroy agricultural land, a professor emeritus of planning from Smithers told an electricity forum recently.

Irving Fox, former planning professor and director of the Westwater Research Centre at UBC, was among the speakers at the third annual Electric Energy Forum held in Prince George May 6-8.

The only way to avoid building more dams is to change the way we order our economy.

In an interview in Smithers after his speech, Fox said energy production and consumption should not exceed the ability of the environment to sustain itself.

To do that, B.C. Hydro should "foster and encourage" a different type of economy, he said.

Here in the north pulp and paper is increasingly becoming a mainstay of the economy, an industry that is expected to increase its electrical consumption by 64 per cent by the turn of the century, Fox said.

In addition, forecasts call for an eight-per-cent increase in each person's household electrical consumption during the next decade.

Substantial electrical production will be available in B.C. without building dams, he said, noting the as yet untapped reserves of the Keenlyside Dam near Castlegar and the excess power available from Alcan's Kemano project.

As well, the Canadian-U.S. Columbia River agreement expires in 1998, meaning power produced in the U.S. from Canadian water will be returned across the border.

"I think there's a general assumption we should keep that rather than sell it," Fox said.

But to meet the increasing demand for electricity, B.C. Hydro says its Site C project in the Peace River Valley must go ahead by the end of the century.

Fox said the only way to avoid building more dams is to change the way we order our economy.

"We have to develop industry and business with a high value-added component per unit of electricity used."

For example, he said, rather than let the north's economy become pulp-and-paper dependent, other forms of forest employment should be considered such as more value-added wood processing.

"In Prince George you find a hell of a lot of electricity per man year of employment. What I'm saying is if we want to avoid building more electric dams then we're going to have to reorder our economy."

Changes in societal values should also be encouraged as a policy of business and government, Fox said.

His thesis goes like this: Rather than being motivated by the pursuit of higher income to buy more goods and prestige, people and businesses should be encouraged to adopt lifestyles more in line with the welfare of communities.

Given a choice, people will opt to alter lifestyles rather than allow a decline in environmental quality, Fox said.

Energy production and consumption should not exceed the ability of the environment to sustain itself.

"We're not going to get a change unless a concrete program is laid out. Once you lay those choices out, I believe the public will opt for a change in lifestyles."

Fox said he is encouraged by B.C. Hydro's energy conservation programs for homes, businesses and industry, but adds that the electric company must take a more active role in matching current electric supplies to a stable, "no-economic growth society" by the year 2000.

"With the current situation in the world and the long-term prospects in Canada, we're going to have to do it."

The Times Colonist (Victoria, B.C.)

MAY 27 1990

New current at Hydro

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In the bad old days, when B.C. Hydro used to do and build pretty much what it wanted, there was no mention of "shared values." It was more like "what's good for B.C. Hydro is good for the province."

Times have changed. Not only has Hydro had to scale down or delay some favorite projects (such as the Site C hydroelectric project on the Peace River), the B.C. Utilities Commission just last month halved a nine per cent rate hike (over three years), proposed by Hydro as a conservation measure.

The setback was probably one of the things which prompted Larry Bell, who took over the corporate reins at Hydro three years ago, to declare that he is "not happy" with the "adversarial nature" of the public hearing process. It is not conducive, he says, to producing "shared values."

In a speech to an Electric Energy Forum in Prince George, Bell said: "the whole concept (of public hearings) is destructive — not constructive — and I think we need to modify the way we do it."

Bell would prefer to see "a reasonable number of choices laid out and the data examined by the involved parties, leading to terms of reference for the public to review and criticize . . . followed by a 'properly constituted competition' to produce the knowledge that everyone can use 'in a collective sense' to reach a decision."

Gee, that sounds suspiciously like what happens at a public hearing. The reality is that sometimes there are conflicting rather than shared values at issue and hard decisions have to be made. Could it be that Bell's target is not really the public hearing but the BCUC, a body with the clout to bring Hydro to heel?

Surrey Leader (Cloverdale, B.C.)

JUN. -6. 1990

Private sector to play energy role

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B.C. Hydro will no longer be the only game in town, according to Minister of Energy, Mines and Resources Jack Davis.

Davis told a group of more than 200 delegates to the third annual Electric Energy Forum in Prince George that the field of power development will become more competitive.

"B.C. Hydro will continue as the entity that will serve the core market (but) Hydro will no longer be the only game in town," he said.

The minister said that because of the regulated environment in which Hydro operates, consumers in B.C. are paying "bargain basement prices" for electricity.

"We're trapped in an institutional arrangement where electricity is being sold at only a fraction of what the open market would otherwise bear. This has mixed blessings," he said.

Davis said that low-cost energy leads to wastefulness and higher levels of consumption than would be the case if all costs were included in the pricing mechanism.

Private sector power production, he said, will allow for regional differences and local economic development.

This would be especially advantageous for northern communities where untapped gas resources and potential hydro sites can be developed locally and in turn attract industry, he said.

Private or investor-owned companies are now able to take advantage of business opportunities to develop alternative sources of power from different sources, he said.

In some of these cases, he said, there will be environmental advantages.

The use of woodwaste in cogeneration plants such as that recently announced for Williams Lake is an example of how social benefits can be achieved from independent power production.

The potential for power pooling also exists, Davis said, where independent power producers can sell surplus production in the open marketplace on a supply-demand basis. This will open new opportunities for efficiencies and cost-savings in the future.

Peace Arch News (White Rock, B.C.)

JUN. -9. 1990

Policy changing for B.C. electricity production

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New directions in British Columbia's electricity policy have been outlined by provincial Energy, Mines and Petroleum Resources Minister Jack Davis.

Davis told more than 200 delegates to the third annual Electric Energy Forum held in Prince George, that B.C. Hydro's role is becoming more definitive. While continuing as "the entity that will serve the core market, Hydro will no longer be the only game in town."

The minister also noted that because of the regulated environment in which Hydro operates, consumers in B.C. are paying "bargain basement prices" for electricity. "We're trapped in an institutional arrangement where electricity is being sold at only a fraction of what the open market would otherwise bear."

"This has mixed blessings," said Davis, explaining that the advantage of low-cost energy leads to wastefulness and higher levels of consumption than would be the case if all the societal and environmental costs were included in the pricing mechanism."

Private sector power production will allow for regional differences and local economic development.

Private sector power production, he said, will allow for regional differences and local economic development, resulting from industry's ability "to go its own way" without having to rely on Hydro's involvement.

"This is particularly advantageous for northern communities where untapped gas resources and potential hydro sites can be developed locally, thereby attracting industry."

Private or investor-owned companies, he said, are now able to take advantage of business opportunities to develop alternative sources of power from different sources "to sell energy to customers such as those involved in resource-processing at agreed upon prices for the life of a contract."

These prices, he suggested, "may be quite different from those charged by Hydro whose costs are averaged over all its facilities."

In some of these cases, he said, there will be environmental advantages. The utilization of woodwaste in cogeneration plants such as that recently announced for Williams Lake is an example of how social benefits can be achieved from independent power production.

Where environmental incentives are applied at the local level, he said, "Hydro's dividend payment to government is reduced and the cost is borne by the community at large."

The potential for power pooling also exists where independent power producers can sell surplus production in the open marketplace on a supply-demand basis.